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The American Geriatrics Society

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JOURNAL OF

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VOLUME II *October, 1954* NUMBER 10

THE USE OF ESTROGEN AFTER THE MENOPAUSE*

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Both physician and patient continue to be confused as regards the indications or contraindications for the administration of estrogens during, but especially following, the female climacteric. The initial impression that estrogenic material is carcinogenic continues to prevail in some quarters and enough papers regarding this possibility are published each year to keep the whole subject in a constant state of controversy. Since this problem arises during the lifetime of all women in the middle-age group, what attitude should one take in clinical practice?

To begin with, one should state what estrogen accomplishes in the body economy. What is the purpose of the hormone from the beginning of its spontaneous elaboration, a year or so before the onset of the menarche, up to the time it ceases to be a major factor in the physiologic life and function of the female? Its initial purpose is undoubtedly the preparation of the organism for procreation. As the estrogenic hormone is increased, the female is gradually brought to a state of sexual maturity. Not only is this true of the soma with its alluring contours of the body, the soft and pliant skin, the fully developed mammary and vaginal tract, but the psyche as well. Biologically speaking, she is then awakened to the requirement for a mate. The vaginal tract is moist and easily capable of being stimulated, an incitement to procreative endeavors for both the male and female. Everything about this woman is designed to attract the male. She becomes increasingly cognizant of a subtle power in her relationship with the opposite sex. It is her inherent right to marry, to procreate, to wield a continuous influence in the lives of her husband and family.

* Presented at the Annual Meeting of the American Geriatrics Society, San Francisco, California, June 17–19, 1954.

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ESTROGEN DEPRIVATION

On the other hand, it is fruitless to reiterate all the classic bodily changes incident to total estrogen deprivation. Suffice it to say that both the psyche and soma suffer, accordingly. In the case of ovarian agenesis or early castration the attractive sexual attributes of both body and mind never develop; following a period of normal estrogenic elaboration as in the menopause, complete withdrawal of the hormone is frequently accompanied by regression to a shell of the former alluring woman. The dry, atrophic, irritable, sometimes hemorrhagic vaginal tract is no longer conducive to a continuation of satisfactory intercourse. Minor sexual misunderstandings frequently arise and lead to serious family difficulties. The patient ages physically and mentally, the latter at least insofar as her ego is concerned. She becomes insecure, inadequate and ultimately careless during the most vulnerable period of her marital existence. One should also mention that this is the first free period. No longer harassed by a houseful of young children or the fear of pregnancy, she is able to spend more time with her husband and to enjoy a more satisfactory sexual and intellectual companionship than at any other time in her married career. There is also a large group of attractive women widowed in the fourth or fifth decades to be considered. Their greatest asset, either from the standpoint of remarriage or for an active and stimulating future existence, lies in feeling and looking as youthful as possible.

Aside from the philosophic and sexual aspects of this problem, there are several outstanding physical changes which ensue following estrogen deprivation. Albright (1) says, "that although frequently overlooked in treatises on bone disease, postmenopausal osteoporosis is the commonest of all systemic osteopathies." As in the castrate, the pituitary gonadotropins are elevated, with far-reaching effects upon the endocrine system. Coronary atherosclerosis associated with high plasma cholesterol values has been found to be more common in bilaterally oophorectomized women than in normal controls (2). Secondary hypertension is occasionally encountered. And last but not least, for some women, the relative androgenicity of the postmenopausal status plays tricks upon the soma. I could give a number of well documented case histories of each of these disorders if time and space permitted. Suffice it to say there is ample experimental and clinical evidence to show that estrogen is capable of stimulating osteoblastic activity and restoring calcium to the bones (1); it can also cause lowering of plasma total cholesterol levels in atherosclerotic conditions in both animals (3) and in man (4). I have not dwelt upon the vasomotor and other autonomic phenomena, since most laymen, and I am sorry to say many physicians, continue to look upon the menopause as a simple disorder of the nervous system characterized chiefly, if not solely, by hot flushes. By such reasoning the woman is usually overlooked (5).

I have deliberately pictured the worst that can happen in rapid and total estrogen deprivation. Fortunately it appears that there are two types of women—physiologically speaking—at the climacteric. One type suffers rather sudden and complete deprivation of estrogen, followed by rapid changes in skin and bone, atrophic changes in the breast and generative organs and severe autonomic instability. The other type may cease to menstruate but, as shown by good

vaginal cornification, continues to elaborate submenstrual levels of estrogen for an additional ten or fifteen years. In the latter, the symptoms of estrogen deprivation occur much more insidiously and may not become grossly apparent until the sixth decade of life. This is the reason why one such fortunate individual has little sympathy for the other not so fortunate, and why many physicians feel that all women who complain are vapid and neurotic because they see other women who are practically devoid of symptoms of the menopause. The fact remains that all women at this period begin to show degenerative changes in the soma, some severe, some slight, but all progressive.

ESTROGEN SUBSTITUTION THERAPY

In the past fifty years the life expectancy of the female has increased from 48.7 to 72.4 years (Table 1). Formerly most women who survived until the fifth or sixth decades expected to be, and actually were senile in both appearance and perspective. They had fulfilled their destiny as seed-pods and were willing to dry up and blow away. However, the grandmother of today is, or should be, an entirely different person. She no longer willingly relinquishes the husband of her youth to the designing widow down the street. By reason of freedom from crippling disease, better nutrition, clever cosmetology, greater social freedom and smarter raiment she can hold her place with women even twenty years her junior—that is, provided she remains in some degree physiologically intact.

The Question of Contraindications

If then, one is able to establish a case for estrogen substitution in a good many women following the climacteric, what have some considered the contraindications for its use? First, the fear of cancer, especially of the breast and genital tract. Second, the fear of producing postmenopausal uterine bleeding because of estrin-induced endometrial hyperplasia (also considered by some a precancerous condition (6)). Third, the fear of prolonging the physiologic adjustment to the menopause until the fifth or sixth decade. Fourth, the feeling that the menopause

TABLE 1. *Expectation of Life at Birth in the United States*
(Years)

Year	Male	Female	Both Sexes
1900	46.6	48.7	47.6
1910	48.6	52.0	50.3
1920	54.4	55.6	54.9
1930	59.7	63.5	61.4
1940	62.1	66.6	64.2
1948	65.5	71.0	68.0
1949	65.9	71.5	68.4
1950	66.6	72.4	69.2

Source: National Office of Vital Statistics, Department of Health, Education and Welfare. Life Insurance Fact Book, 1953. New York, N. Y., Institute of Life Insurance, p. 93.

is a natural phenomenon and should not be tampered with. Let us consider the cancer issue first.

Cancer?

Several years ago oophorectomy was instituted in an attempt to arrest the growth of breast and uterine cancer, and in some instances there appeared to be a temporary postponement of metastases or alleviation of already existing lesions. However, the end-result was inevitably the same. Still later, bilateral adrenalectomy came into vogue; and apparently hypophysectomy is now being employed in the human, but results have yet to be published. At about the same time some cancer surgeons reversed the procedure and began giving estrogens to postmenopausal women suffering from breast cancer; the results were as good or better than those from the withdrawal process in younger women. Huseby (7), after administering estrogen to 100 such women said, "We believe estrogen therapy in women five years or more after the menopause to be the treatment of choice where the soft tissues of the body are involved with the neoplastic process . . . our experience would indicate that although estrogen therapy is not curative, very significant and oft times prolonged control of the disease can be effected by its use. As far as we can judge at the present time the only rationale for the use of this seemingly paradoxical therapeutic regimen lies in the clinical demonstration of its effectiveness." It is not unusual now for a cancer authority to expound the benefits of oophorectomy in the first half hour of his address and in the last half hour show pictures of angry cancerous lesions melting away following estrogen administration. From all this confusing and paradoxical data it would appear that the growth of cancer cells, like that of normal tissue, is influenced by a complicated hormonal and perhaps enzymatic environment. There is no evidence, however, that estrogen or any other hormone initiates, generates or produces cancer. The subject is such an important one, especially from a teaching standpoint, that I have attempted to correlate the trend in the death rate from cancer of the female reproductive organs with the general use of estrogen in the last twenty years as follows:

"Estimates based upon the figures compiled from official government data relative to imports, and from figures compiled by the drug trade, show that 700 kilograms of estrogens, both natural and synthetic, are manufactured or imported into this country every year. For the purpose of calculation, if this be considered in terms of estrone, and if one mg. of estrone be considered the unit dosage either by injection or by mouth, the total would add up to 700,000,000 doses or enough to treat 7,000,000 women twice weekly with one mg. of estrogen" (8). Just how many women in the United States use some form of estrogenic material, for how long, and in what manner, is unknown. From these statistics, however, one would infer that the users are in the millions rather than in the hundreds of thousands. In the face of such findings it would appear that if estrogen were carcinogenic or even an inciter or percursor of carcinoma, the incidence of malignancy of the breast and the procreative organs should be much greater now (1950) than in 1930, when few, if any, women used estrogen. Yet the death

TABLE 2. *Death Rates Per 100,000 (White) from Cancer of Uterus and Breast*

Age group	Year 1930	Year 1940	Year 1950
	Cancer of Uterus		
35–44	26.4	24.7	22.9*
45–54	56.9	49.8	54.3*
55–64	85.1	72.9	83.1*
65–74	104.6	100.5	107.1*
	Cancer of Breast		
35–44	18.0	19.1	20.8
45–54	44.8	47.3	47.1
55–64	75.4	76.0	70.9
65–74	93.1	106.4	96.3

* Statistics for "Uterus" not available. Recorded as "genital organ."

Source: Vital Statistics—Special Reports: Vol. 32, No. 3 July 19, 1950; Vol. 36, No. 14 March 21, 1952; Vol. 37, No. 11 November 2, 1953.
U. S. Department of Health, Education and Welfare, USPHS, National Office of Vital Statistics.

rate from cancer of the organs in question, per unit of population in all age groups, is essentially the same now as it was during the year of Doisy's discovery of estrogen (Table 2). One might argue that earlier detection, and better surgery and all that goes with it accounts for this fact, but by the same token one should not forget that the life expectancy of the female has increased by nine years in the last two decades, and it is a matter of record that the incidence of malignancy of this nature increases with age.

Endometrial hyperplasia?

If then the probability of producing cancer is very remote, as I feel it must be in the face of such statistical evidence, endometrial hyperplasia *per se* with occasional instances of postmenopausal bleeding is no problem for the careful observer. Women are susceptible to estrogenic preparations in varying degrees, that is, the target organs of some are so sensitive that small doses of estrogen will produce bleeding years after the menopause, whereas it may take many times such a dose to produce withdrawal bleeding in a young amenorrheic woman. The sensitivity to estrogen of older women who lack it completely appears to be somewhat similar to the sensitivity of the myxedema patient to thyroid or the male castrate to testosterone. The greater the deficiency the more demonstrable the change with replacement therapy. The dose, preferably by mouth, for any woman past the menopause should be below the bleeding level. This may have to be gauged by experimentation, during which bleeding may occur. After a brief period of trial and error, however, it is not difficult to avoid untoward effects. It is unfortunate that so many excellent gynecologists, harassed by the untoward results of careless and unskilled administration of estrogens, become therapeutic nihilists; they are in an enviable position to employ such material judiciously.

Prolongation of adjustment?

The argument that one prolongs or rather postpones the physiologic adjustment to the menopause by estrogen administration is usually answered by the women themselves. Most of them are happy to be relieved of the burden of menstruation and the fear of a late and unwanted pregnancy. However, with regard to the vasomotor phenomena, the vaginal atresia and associated symptoms, they want to know what is wrong with having this objective evidence of deterioration in the sixties or even seventies instead of in the forties, if one is destined to live an additional twenty or thirty years.

Tampering with nature?

The final argument that the menopause is a natural phenomenon and should not be tampered with, is to me the most vapid of all. It is reminiscent of the outworn arguments against anesthesia in childbirth, against cosmetics, against everything progressive in life. When I was a young man, any woman who used cosmetics or smoked cigarettes was a bad woman. Proper ladies fainted at the word "sex." The female anatomy was effectively, if atrociously, hidden from the roving eye of the male. People died by the hundreds of typhoid, of smallpox and of diphtheria. We no longer live in that day of the survival of the fittest. The very person who argues that the menopause is a natural phenomenon fights nature very day. He pasteurizes his milk, boils his instruments, vaccinates his stock and his children, sprays and buds his fruit trees, flies against gravity, makes new elements and splits the atom. Is the menopause any different? During the past fifty years women have overcome the prejudice against cosmetics, political equality and freedom of dress. I am convinced that as they grow older, anything which keeps them looking, feeling and acting young will be employed with or without the sanction of the medical profession. Phenobarbital, anticholinergic drugs, and psychotherapy, advocated by so many, may help to alleviate the hot flushes and the panic reactions incident to the menopause, but they will not postpone the aging process. Estrogen will.

COMMENT

The employment of estrogenic material as a physiologic-gerontologic tool is an individual and not a general problem. It is perhaps trite to say that every patient should be carefully examined and followed. The presence of tumors of unknown pathology in the breast or pelvic organs, or a high incidence of such cancer in the patient's family, may alter one's therapeutic approach in a given case—not because of fear of producing cancer, but because of the medico-legal hazards, should an unrelated cancer develop in such a treated person. This is no reason why women who will profit by estrogen (and their number is legion) should be continually harassed by irresponsible articles and conversations regarding the Damoclean sword of cancer hanging over their heads. Androgen, either alone or in combination with estrogen, has purposely not been discussed in this paper. It is a subject in itself. Suffice it to say that androgen *per se* is no substitute for estrogen in the aging woman.

SUMMARY AND CONCLUSIONS

1. Estrogen is the natural physiologic concomitant of the youthful status of the female.

2. The female's life expectancy has increased twenty-four years since the turn of the century, whereas the time of the menopause or transition from the youthful physiologic status to that of the rapidly aging status has remained the same.

3. Phenobarbital, anticholinergic drugs and psychotherapy may help the subjective symptoms of the menopause, but they will not postpone the aging process. Estrogen will.

4. Enough estrogenic material is either being manufactured in, or imported into the United States each year to treat several million women. It is inferred that most of this material is employed.

5. Since the death rate from cancer of the breast and genital organs is no greater now (1950) than it was before crystalline estrin was discovered and used (1929), it would appear that the fear of genital cancer from its use is greatly exaggerated.

6. The employment of estrogen in the postmenopausal woman is an individual problem which should be considered and controlled by the gerontologically-minded physician.

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DIAGNOSIS AND MANAGEMENT OF TRIGEMINAL NEURALGIA

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Trigeminal neuralgia, or tic douloureux, is predominantly an affliction of people in the latter years of life. Though it may appear at any age, an age-onset analysis by Peet (1) showed that in over half the subjects the pain began between the ages of 40 and 60 years. By the time patients are finally seen in a neurosurgical clinic, they usually have tolerated the pain for many years. This delay in seeking treatment is often caused by fear of surgery, based on memories of the results of now-outmoded procedures. At last, in desperation because of intolerable pain, the patient appears and is resigned to any fate that offers relief. In most large series of cases, the sexes are about equally represented.

SYMPTOMATOLOGY

The symptoms of trigeminal neuralgia are so stereotyped that many times the experienced physician may make the diagnosis on the basis of a telephone conversation alone. The important features of the pain are its instantaneous explosive onset, its short duration, its periodicity, its constant localization within the area of distribution of one or more branches of one trigeminal nerve, its temporary complete disappearance without residual phenomena and its association with "trigger-zones." The absence of any objective signs of trigeminal nerve damage "clinches" the diagnosis.

The first attack of trigeminal neuralgia usually comes like "a bolt from the blue," as a flash of momentary pain in one side of the face. This clears as quickly as it began, and the patient has no other symptom until the second attack. This may occur within the next few minutes, or it may not occur for months. Then the seizures usually show a pattern: pain recurs in paroxysms over a period of a few weeks or longer, disappears completely, but recurs after the passage of several months. A roughly seasonal periodicity may develop, so the patient learns to expect attacks at certain times of the year. Usually the periods of pain become progressively longer and the intervals of relief shorter. The pain rarely occurs at night, except in cases of long duration.

The individual pains are instantaneous and extremely severe. The victims often describe them dramatically as a "whip lash," a "stroke of lightning," a "flash of fire," or as a "red-hot poker" burning the face. No patient confuses this pain with that of a toothache or an infected sinus, which should not arouse the suspicion of trigeminal neuralgia. The paroxysm of tic douloureux usually freezes the patient in his momentary posture, but may make him clutch at his face. The paroxysmal character of the pain is important. If the patient insists that it lasts for minutes or longer, he usually will agree that this time-period actually covers a rapidly recurring series of individual paroxysms. In the early stages of the affliction, the pains cease without residual discomfort. In the later

stages, the face may continue to smart and tingle for minutes after the severe pain has ceased. Very important, moreover, is the fact that the pain never becomes a dull, deep-seated, chronic one, which necessitates anodynes or narcotics.

The location of the pain is also characteristic. It occurs *only* in the distribution of one or more of the branches of one trigeminal nerve. Very rarely will both sides be affected, and then practically never simultaneously. The second division of the nerve, supplying the cheek and upper lip, is probably the most commonly affected, the next in order being the second and third divisions (upper and lower jaws). Next most frequently affected is the entire side of the face. More rarely, the first division alone, involving the eye and forehead, may be attacked. The pain continues in the specific facial area in which it begins; there is no migration from one area to another. As the condition persists over months or years, the pain may progress to involve more of the trigeminal area than originally, but it usually begins each time in the original spot. That the pain never extends beyond trigeminal distribution is a most important diagnostic point. It does not spread under the jaw, behind the ear, down the neck or beyond the midline. When this occurs, trigeminal neuralgia is ruled out and other causes for the complaint must be sought.

Another characteristic of the malady is the occurrence of "trigger-zones" within the area of pain. These are skin zones with which contact will produce the paroxysms of pain. These areas are usually near the mucocutaneous borders of the lips, nose or lids, but may be on the surface of the cheek, tongue or alveolar ridge. The "trigger-zones" are sensitive during the period of pain involvement, but may be handled freely during periods of remission. The sensitivity of the zones frequently prevents washing, shaving, or powdering the face; wearing of dentures or brushing the teeth; often even eating, drinking or talking. In severe cases this may result in dehydration or malnutrition. The patient frequently talks in a stiff-lipped manner, avoiding motion of the facial muscles. Occasionally the trigger-zone may migrate, if the pain extends to involve another trigeminal division. When the pain period is over, all these phenomena disappear.

Neurologic examination of patients with trigeminal neuralgia reveals no abnormality except reproduction of pain on stimulation of trigger-zones. The neurologist is aware, nevertheless, that typical trigeminal neuralgic pain can be caused by organic lesions compressing the Gasserian ganglion or the sensory root. These lesions usually, but not always, betray their presence by disturbing conduction in the nerve, by producing objective numbness in the face or cornea, or by being associated with disturbances of adjacent cranial nerves (such as the acoustic) or those supplying the extrinsic ocular muscles. A careful neurologic examination is indicated in all cases.

DIFFERENTIAL DIAGNOSIS

Although individual differences in the character of the pain are found in different patients, the pain is so typical that one is rarely in doubt of the diagnosis in a true example of the disease. It has become almost axiomatic among those familiar with the malady that "if you are in doubt, it is not tic douloureux!" The chief error occurs in making the diagnosis in doubtful cases. Mistaken and

ineffectual therapy may follow. The so-called "atypical tic" is the main source of difficulty. In this case, the pain is not characteristic in either distribution or duration. It is deep, boring, constant and without pain-free remission; and it usually occurs in persons of neurotic temperament. Treatment specific for trigeminal neuralgia gives these patients no relief, and usually intensifies their misery.

The only condition liable to be seriously mistaken for trigeminal neuralgia is that caused by compression of the trigeminal nerve by an intracranial neoplasm or aneurysm. If diagnostic doubt persists after a careful neurologic examination, cerebral angiography or air studies may be necessary. Even interruption of the nerve by alcohol injection or sensory-root section may not rule out this rare condition, since the pain of root compression also may be abolished by interruption of the pain-conducting fibers both distal and proximal to the lesion.

TREATMENT

Medical

The cause of trigeminal neuralgia is not definitely known, but because of its periodicity, many forms of medical therapy have been tried, widely heralded, and finally abandoned. The medical therapy currently under investigation is the administration of vitamin B_{12}. Since this is considered harmless, a trial probably is justified. The material is given intramuscularly in 500-microgram doses twice a day for ten days. A successful result should be apparent within that time. The treatment may be repeated if the pain recurs.

Alcohol injection

Until recently, benefit has resulted only from the interruption of the trigeminal nerve. This may be produced temporarily by injection of small amounts (0.5–1 cc.) of absolute alcohol into the affected peripheral branch of the nerve. This procedure should be carried out only by one skilled in the technique, for it must be performed without anesthesia and momentarily it is very painful. A good injection into the maxillary or mandibular nerve at its foramen of exit from the skull results in anesthesia of the affected area of distribution, and relief of pain for periods varying from six months to two or three years. Since the Gasserian ganglion is inside the skull and is not affected by the nerve block, the nerve eventually regenerates; when anesthesia of the face clears, the pain recurs. The injection may then be repeated, but since the first one has caused scarring within the nerve, the alcohol does not again extend so well through the structure, and the result is neither so good nor so lasting. Usually no more than two or three injections can be expected to be beneficial. It is wise to encourage the patient to seek surgical aid at the first recurrence; each delay subjects him to the hazard of additional complications incidental to advancing age.

Trigeminal rhizotomy

Until 1952, partial or complete trigeminal sensory-root section was the only completely and permanently effective treatment for the severe pain. The pro-

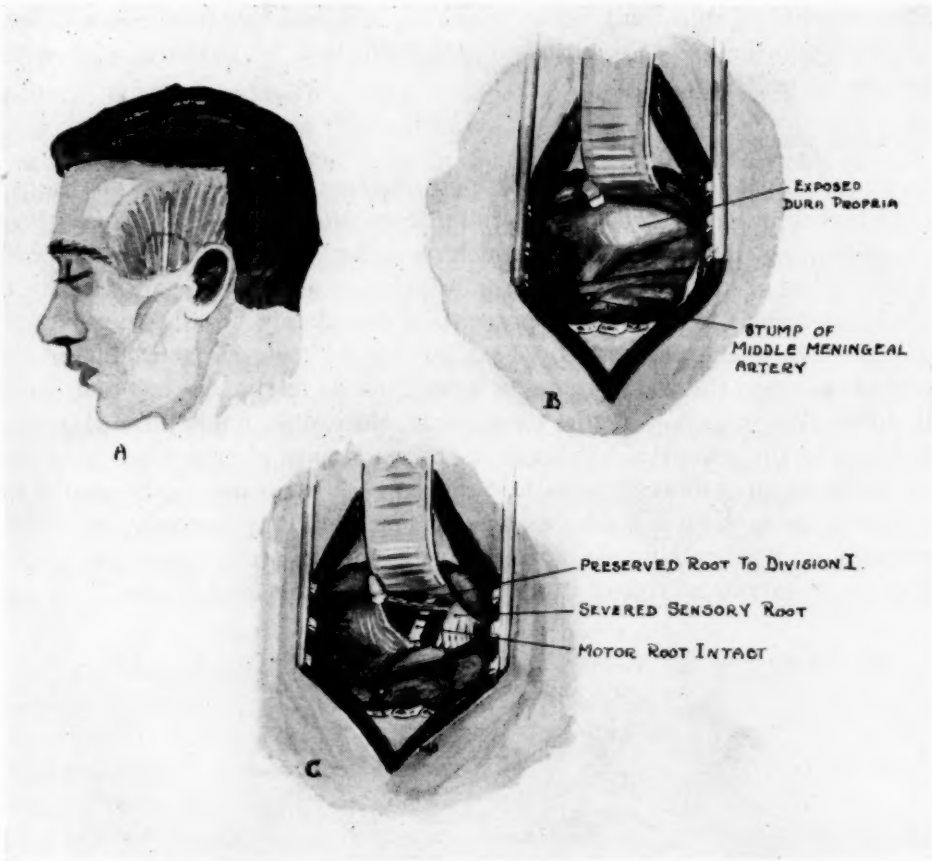

FIG. 1. *Trigeminal neuralgia.*

A. Location of incision and bone defect in shaved left temporal scalp.

B. Dura elevated, exposing sensory root in dura propria.

C. Dura propria incised, lower ⅔ of sensory root severed, showing first-division fibers and motor root preserved.

cedure may be carried out in either the temporal or posterior fossa, according to the preference of the surgeon, with minimal morbidity and mortality. Although this operation is performed usually in persons of advanced age (into the tenth decade) it has, in the hands of skillful neurosurgeons, a mortality rate no greater than 0.5 to 1 per cent.

The patient usually can leave the hospital on his fifth to seventh postoperative day, with an invisible scar concealed by his hair, and with no more side effect than numbness in the denervated part of the face. In only an occasional patient does facial palsy develop, and this usually clears within a few weeks. Persistent fear of facial palsy is a residual of former days when extensive facial incisions were made for avulsion of peripheral branches of the nerve. The nerve root (Fig. 1) now is usually severed partially, sparing the ophthalmic division, unless it also is involved. This method avoids the corneal anesthesia that in the past frequently caused corneal ulceration. It can be fairly stated that, in general, the results of

modern trigeminal rhizotomy are so excellent, safe, and free from complications, that the operation has no serious contraindication in patients with severe trigeminal neuralgia.

Trigeminal tractotomy

In an attempt to relieve tic pain without anesthetizing the face, Olof Sjöqvist (2) of Stockholm, developed a method of interrupting the trigeminal pain fibers, while preserving those transmitting touch sensation. He described this procedure in 1938, calling it "trigeminal tractotomy." Unfortunately the pain tract in the medulla occupies a position that prevents a completely harmless interruption of all the pain fibers, particularly those serving the "muzzle area" of the face, where are situated the trigger-zones of most patients having the common second and third division pain. Sjöqvist's operation, then, does not replace trigeminal rhizotomy as the operation of choice in the usual case of trigeminal neuralgia. It is, however, an excellent one for first division tic, or for use on the second side of bilateral cases, when one side has been denervated. It is especially valuable in such cases when the motor root of the opposite side has been damaged at the first operation. It carries no risk of that complication on the second side.

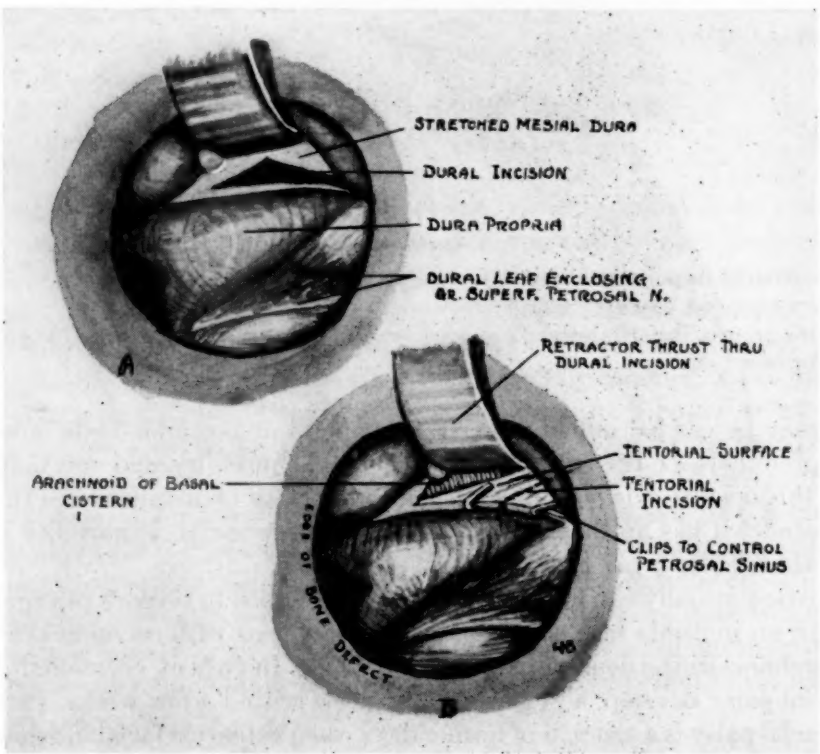

FIG. 2. *Trigeminal decompression.* The sensory root is exposed as for trigeminal rhizotomy.

A. Mesial dura incised above sensory root.

B. Retractor thrust through dural incision. Silver clips placed on dural edge of tentorium to control petrosal sinus; plane of tentorial incision indicated by dotted lines.

Trigeminal root decompression

In 1951, Palle Taarnhøj (3) of Copenhagen, described a new method of relieving the pain of trigeminal neuralgia without producing anesthesia of the face. The sensory root (Fig. 2) is exposed in the middle fossa, as for rhizotomy, but instead of severing the root the surgeon divides the dural ring through which the root extends from the posterior into the middle fossa. Taarnhøj's operation was soon tested by other surgeons, who confirmed his therapeutic claims. Technically the operation is a little more difficult to perform than is the rhizotomy, but can easily be mastered by a surgeon skilled in the older operation. In eighteen months we have employed the procedure in 18 cases. In 3 cases the original section was incomplete and required reopening the wound and extending the dural incision. In 1 case, since the pain was not relieved after the ring was completely opened, the sensory root was partially severed; this controlled the pain.

The effect of the new operation reopens the question of the cause of trigeminal neuralgia. Olivecrona (4) suggested that the pain might be the result of traction on the root as it crosses the petrous tip, caused by sagging of the brain induced by cerebral atrophy incidental to the aging process. Gardner (5) suggests that this process may produce intraradicular synapses which cause nerve impulses to be short-circuited, as observed in causalgia in peripheral nerves.

The effects of the new operation have been followed for only three years, so it is possible that the pain may recur in some cases. In this event, the root can be re-exposed and severed through the same approach. At present, the chance of stopping the pain and leaving facial sensation intact seems good enough to warrant the use of the decompression operation in all cases.

It is interesting that labial herpes may develop after this operation, just as it does following trigeminal rhizotomy by either temporal or suboccipital approach, or following trigeminal tractotomy. The new operation, like the other two, does not relieve the pains of atypical trigeminal neuralgia.

SUMMARY

Trigeminal neuralgia, an affliction of patients in the geriatric age group, may be diagnosed on the basis of a characteristic symptom-complex. The pain may be relieved by interruption of the affected trigeminal nerve pathways or by a recently described operation for decompression of the trigeminal sensory root. These procedures can be performed safely and with little morbidity in geriatric patients.

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BIOCHEMICAL ASPECTS OF ATHEROSCLEROSIS

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Irving Wright (1) has recently written, "The position may be taken and rather well defended that all evidences of senility are secondary to the primary mechanism of arteriosclerosis." Considered as a single syndrome, regardless of the organ affected, arteriosclerosis is "foremost, both from the standpoint of occurrence of disease and as a cause of death." Consequently the importance in geriatrics of atherosclerosis, the most common and important form of arteriosclerosis, need hardly be stressed.

For many years atherosclerosis was almost exclusively a province of the pathologists. The natural history of the disease in humans was studied and described in great detail from observations on postmortem material; the increase in severity with age suggested that atherosclerosis is an inevitable result of aging and the spotty and irregular distribution of the lesions made evident the importance of local tissue factors. However, the discovery by Anitschkow and others in 1910–1912 that very similar lesions can be produced in rabbits by feeding cholesterol (2), changed the picture drastically. It not only made possible the study of an experimental form of the disease but it disposed of the old and fruitless idea that atherosclerosis is an "inevitable result of aging"; further, it showed clearly that although local tissue factors may determine the particular location of a lesion, they do not necessarily determine whether or not any lesions will develop. Dietary cholesterol alone will rapidly produce spotty atheromatous lesions in rabbits, so it is obvious that under these conditions local factors are playing only a secondary role. A further result of linking atherosclerosis with cholesterol was to attract the interest of biochemists in this disease. Windaus and Schoenheimer were among the first to make important advances in atherosclerosis by the application of chemical methods, and the number of biochemists working in this field has steadily increased, until now they perhaps even outnumber the pathologists.

ETIOLOGY OF ATHEROSCLEROSIS

Experimental atherosclerosis in animals, induced by cholesterol feeding, has raised two main questions which have been argued endlessly during the last two decades: 1) Is human atherosclerosis due to a sustained hypercholesterolemia, and 2) is human atherosclerosis a result of too high a dietary intake of cholesterol?

Hypercholesterolemia

There is general agreement at present that a sustained hypercholesterolemia of 400 mg. per 100 cc. or higher is damaging to artery walls and will ultimately induce atherosclerosis. Such levels are practically never encountered in essential

atherosclerosis, in the absence of endocrine dysfunction or congenital hypercholesterolemia. The crucial question is, what level constitutes hypercholesterolemia. The misleading argument is often advanced that atherosclerosis cannot be due to hypercholesterolemia because many persons with plasma cholesterol levels in the so-called "normal" range of 160–300 mg. per 100 cc. have atherosclerosis, as shown by the occurrence of coronary occlusion. The normal range for cholesterol is based on the average of a population group with no clinical evidence of atherosclerosis, but by no means free of the disease. This range can be accepted as normal only if we also accept silent atherosclerosis as normal. Young women, a group relatively free of atherosclerosis, have definitely lower plasma cholesterol values than middle-aged men. For example, Barr and associates (3) found a mean value of 187 mg. per 100 cc. for women aged 18–35; 239 mg. for normal men aged 45–65; and 259 mg. for survivors of myocardial infarction. It can be argued that the population in this country as a whole suffers from a slight degree of hypercholesterolemia, particularly during middle age. Whether the decrease in later life is due to the weeding out of those with the higher levels, because of cardiovascular disease, or to other causes is not certain.

Existing evidence from areas relatively free of atherosclerosis supports this argument. Data from China (4), Okinawa (5, 6), Central America (7), and from poorer classes in Naples and Madrid (8), agree in indicating that these population groups show a very low incidence of atherosclerosis (as judged by postmortem findings) and have plasma cholesterol levels in a much lower range than in this country. One of the most urgent problems in atherosclerosis research today is a more extensive survey of the relationships of diet, plasma cholesterol level and the development of atherosclerosis in a wide variety of population groups. The freedom from atherosclerosis in some of these groups cannot be regarded as an unmixed blessing, since they are reported as suffering from chronic malnutrition and they have a lower life expectancy than does our population. Whether it is desirable to reduce the incidence of atherosclerosis by producing chronic malnutrition is certainly questionable. Nevertheless, further knowledge along these lines may increase our understanding of the pathogenesis of the disease and provide a rational basis for prevention.

Dietary cholesterol

The answer to the second question appears to be that the cholesterol content of the human diet is of secondary importance as a determinant of the plasma level, and there is no evidence that dietary cholesterol can have an atherogenic effect without influencing the plasma level. Response of the level to an increase in dietary intake of cholesterol varies greatly in different species but humans show a remarkably small response. Messinger, Porosowska and Steele (9) fed massive amounts of cholesterol (30 Gm. per day) for long periods of time and found only slight increases in the plasma level. Many other factors, including the neutral fat and total caloric content of the diet, influence the concentration in plasma. The cause of the high levels commonly observed in humans is to be sought in the homeostatic mechanisms for their regulation.

PLASMA LIPIDS

It was suggested some years ago that the physical state of cholesterol in plasma may be more important in atherogenesis than the total concentration. At the time so little was known about the state of lipids in normal plasma that nothing could be done to follow up this suggestion. During the last few years, however, our knowledge of plasma lipoproteins, both normal and pathologic, has been advanced very greatly, stimulated particularly by the methods of ultracentrifugal analysis of plasma lipoproteins developed by Gofman and his group (10), and by the methods of plasma fractionation developed by Cohn's group (11).

Cholesterol, like the other two classes of plasma lipids—phospholipids and neutral fat—is much too insoluble in water to be present in free solution to an appreciable extent. Normally, cholesterol and its esters and also phospholipids are present entirely in lipoprotein form in plasma and in all tissues as well. Only under pathologic circumstances is cholesterol found dissociated from protein, as for example in gallstones or in atherosclerotic arteries.

Two lipoproteins—or, more precisely, two families of closely related lipoproteins—have been isolated from human plasma by electrophoretic, chemical and ultracentrifugal methods. They are called α and β lipoproteins because, on electrophoresis, they move with the same mobilities as the α_1 and β_1 globulins. Their chemical composition differs and so does their role in lipid transport and metabolism and their relationship to atherogenesis.

The *α lipoprotein*, so unstable that it has not yet been isolated in pure form by chemical fractionation methods, carries about 28 per cent of the cholesterol in normal human plasma, as judged by studies on large pools of blood from adults of both sexes (12). It contains about 39 per cent total lipid and has a density of 1.19. The lipid composition is 18.3 per cent cholesterol, 21 per cent phospholipids, and no neutral fat; the cholesterol-phospholipid ratio (C/P ratio) is 1.3 on a molar basis. Present evidence indicates no atherogenic properties.

The *β lipoprotein* carries about 63 per cent of the plasma cholesterol; it consists of 47 per cent cholesterol, 29 per cent phospholipid and only 23 per cent protein. It also contains 60 per cent of its own dry weight as water of hydration and has a density of 1.032, which is considerably lower than the value of 1.32 for other plasma proteins. When the total cholesterol concentration increases, the increase is entirely in the β lipoprotein fraction. Generally, abnormal components appear with even lower densities and with increasing neutral fat content.

Perhaps the most remarkable and certainly one of the most puzzling facts in lipid biochemistry is the ability of such a small amount of protein to hold in solution in water such a large amount of water-insoluble lipids. Practically nothing is known about the forces or chemical bonds holding the components together. Lipoproteins are notoriously unstable and easily denatured; unlike many other conjugated proteins they have not as yet been successfully taken apart and then recombined. It was shown by Hardy and Gardiner in 1910 (13) that treatment of plasma with large amounts of alcohol or acetone at temperatures of 0° to −10°C. removed all the lipid without apparent denaturation of the protein, but it is difficult to prove that no changes in the protein have taken place.

The importance of water in the structure of lipoproteins is shown by the irreversible denaturation and liberation of lipid produced by freezing below −25°C., or by treatment with such solvents as alcohol and acetone at room temperature. It is curious that lyophilyzed plasma will not give up its lipid on extraction by organic solvents, even alcohol or acetone, until some water has been added.

One of the first suggestions of a difference in the nature of plasma lipoproteins in normal humans and in patients with various diseases was the work of Forbes (14) with a method employing cold chloroform extraction of lyophilized plasma. Only a small fraction of the cholesterol was extracted from normal plasma under these conditions but considerably larger fractions from the plasma in nephrosis, myxedema, some cases of diabetes and some cases of atherosclerosis. These observations suggested that abnormal lipoproteins with a greater instability than normal ones appeared in these diseases.

A less empirical approach was that of Gofman *et al.* (15), who showed that the β lipoproteins constitute a large series of compounds differing in neutral fat content and in density. By special ultracentrifugal methods it is possible to determine the amounts of these groups and to define them in terms of their flotation rates in high density media. In their first publications Gofman and his co-workers found that a small group of abnormal lipoproteins, the $S_f12\text{-}20$ class, showed a high degree of correlation with atherosclerosis, and stated that neither the total cholesterol level nor the levels of other S_f classes were correlated with the disease. They proposed an "atherogenic index" given by the concentration of *$S_f12\text{-}20$ lipoproteins*. As more patients have been studied, the atherogenic index has been modified to include other S_f classes and recently (16) has been defined as: A.I. = $S_f0\text{-}12 + 1.75\ S_f12\text{-}400$. Thus it now includes all β lipoproteins but no α lipoproteins.

A somewhat different approach has been taken by Russ, Eder and Barr (17), who have determined the total α and β lipoprotein cholesterol by Cohn's chemical fractionation methods. They conclude that the *percentage of plasma cholesterol in α lipoproteins* is inversely correlated with atherogenesis. In general, the concentrations of α lipoprotein tend to be in a relatively narrow range; high total cholesterol concentrations usually indicate high β lipoprotein levels. However, these workers believe that the percentage present in the α form is correlated better with atherogenesis than are the β lipoprotein concentration, the total cholesterol level, or the $S_f12\text{-}20$ level. Of special interest is the difference in the percentage of cholesterol in α lipoproteins between young men (25.2 per cent) and young women (34.3 per cent). This difference is considerably larger than that in total cholesterol level (197 and 187 mg. per 100 cc., respectively). It is well established that in this age group (18–35) men have considerably more atherosclerosis than women.

Still another approach is the consideration of the *cholesterol-phospholipid ratio.* An elevated ratio is correlated with atherogenesis in experimental animals and also in humans. Particularly striking is the observation that the hypercholesterolemia of biliary cirrhosis, which is thought to be not atherogenic, is characterized by extremely high cholesterol and phospholipid levels and no increase

in the C/P ratio. This ratio is related to both Gofman's atherogenic index and to the percentage of cholesterol in α lipoproteins. The C/P ratio is 1.3 in α lipoproteins and 2.1 in β lipoproteins on a molar basis. Thus an increase in β lipoproteins will increase the C/P ratio, increase the atherogenic index and decrease the percentage of cholesterol in α lipoproteins.

A variety of methods are available for the determination of α and β lipoproteins. Although this determination cannot be recommended at present as a definitive diagnostic tool in every case, it may often be helpful and the data obtained will increase our understanding of the disease and of the effect of various therapeutic regimens on plasma lipoproteins. The method of Russ, Eder and Barr consists of using Cohn method 10 to separate fractions I + II + III containing β lipoproteins, from fractions IV + V + VI containing α lipoproteins, followed by cholesterol analyses on both. Another method, which appears simpler, has been described by Swahn (18); it consists in separation by zone electrophoresis using filter paper or starch (Kunkel and Slater (19)), followed by elution and cholesterol analysis. The ultracentrifuge method of Gofman can be used for determination of α lipoproteins as well as β lipoproteins, by increasing the density of the medium to 1.21 (Green, Lewis and Page (20)).

Establishment of a correlation between a deviation from normal of some property of plasma lipoproteins and atherosclerosis suggests but does not, of course, prove that this deviation is the cause of the disease. It does provide a foothold for further investigations into mechanisms and factors responsible for the deviation, as well as a useful method of measuring the effects of therapy. Perhaps methods of preventing, arresting and perhaps even of reversing, the development of atherosclerosis may be found by a purely empirical approach, as Keys has pointed out (21). However, a better understanding of normal lipoprotein metabolism, of the effects of various dietary and hormonal factors on it, and of the changes in lipoprotein metabolism which occur in atherosclerosis, would be of great interest and value. The methods for isolation of individual lipoproteins from plasma have been developed only recently, so very little is known about lipoprotein metabolism except for the studies on clearing factor (22). A number of advances in the basic aspects of cholesterol metabolism have been made in the last few years, a few of which are summarized here.

CHOLESTEROL METABOLISM

The cholesterol present in the tissues is partly derived from *synthesis in the liver* and partly from the *diet*. There is no evidence for any qualitative difference in the metabolism of endogenous and exogenous cholesterol. The two mix and become indistinguishable (except when one is tagged with an isotopic tracer) to a certain extent in the intestine and to a much greater extent in the liver and blood (23).

Endogenous synthesis of cholesterol takes place continually in many and probably in all the tissues of the body except the central nervous system. Blood cholesterol is derived from the liver; with the isotope tracer method it has been shown that interchange of unesterified cholesterol molecules between plasma and

liver takes place with tremendous speed; probably more than 1 gram per hour moves from one to the other (24, 25). Red cell cholesterol also is very labile and is interchanged with plasma cholesterol both *in vitro* and *in vivo* at a rate of about 50 per cent in one hour. These findings show that the cholesterol component in lipoproteins is free to dissociate, providing there is another protein acceptor molecule available. This suggests that the concentration of cholesterol may be governed to a considerable extent by the concentration of the various protein acceptors.

The half-life of blood and liver cholesterol is about six to eight days in humans and in several species of experimental animals. In other tissues, the half-lives are longer, but the mixing of blood and tissue cholesterol makes the significance of these turnover times difficult to interpret. The chief *pathway of cholesterol metabolism* is conversion to bile acids and eventual excretion in feces. This route accounts for perhaps three quarters of all the dietary and hepatic cholesterol metabolized (26). Some is excreted as coprosterol, dihydrocholesterol or as cholesterol itself in feces, and some is converted into steroid hormones, but no detectable amounts are oxidized completely.

The first effect of increasing the cholesterol content of the diet is to decrease the rate of synthesis of cholesterol in the liver. This effect has been found in all species of experimental animals tested and is so striking that it can be presumed to occur in humans as well (27).

It appears to be mediated by the cholesterol concentration in the liver but whether it is the free fraction, the esterified fraction or the total has not yet been established. A diet containing 1 per cent cholesterol fed for one day to rats will produce a considerable increase in the esterified fraction, only a slight increase in the free fraction, and a concomitant decrease in synthetic rate to a few per cent of the control value. If the free cholesterol concentration in liver is the controlling factor the mechanism must indeed be sensitive, since an increase of only a few milligrams per 100 grams of liver in this fraction corresponds to a decrease in synthetic rate to half.

The response of hepatic cholesterol synthesis to the increased concentration in the liver may be considered part of the homeostatic mechanism which attempts to maintain a constant level of cholesterol in the liver and plasma despite changes in the dietary intake. This defense mechanism is easily overwhelmed in animals on experimental diets, since the rate of absorption per day may be far greater than the normal rate of endogenous synthesis.

A second line of defense is the *storage of the excess cholesterol* in esterified form in the liver. This material appears to be metabolically rather inert and in some species, particularly the rat, may increase to many times its normal concentration without any marked increase in the plasma level or in the concentration of free cholesterol in liver. Thus the liver cholesterol ester concentration appears to be the most sensitive index of the presence of excessive amounts of cholesterol in the body.

The *plasma cholesterol level* may be considered as being regulated by two types of mechanisms; if the distribution of cholesterol between liver and plasma is

constant, the rate of hepatic synthesis will vary in such a manner as to keep the level in liver and in plasma constant. The distribution between liver and plasma, however, is affected by thyroid function, administration of estrogens or adrenocortical hormones, the presence of bile, surface-active agents in blood (such as Tween or Triton), and many other factors.

One approach to the problem of decreasing plasma cholesterol levels, which is being intensively investigated at present, is *prevention of the absorption* of cholesterol. Sterols closely related to cholesterol, such as dihydrocholesterol and the sitosterols, have the remarkable property of preventing the absorption of dietary cholesterol, the appearance of hypercholesterolemia and the resulting atherosclerosis (28, 29). Preliminary evidence suggests that they may even be capable of lowering plasma cholesterol levels in humans on a normal low cholesterol diet, even though they have no noticeable effect in animals on such diets (30, 31). The effects have been described as being significant in about half the patients studied and the lowering has been greater, the higher the initial level. Progress of these studies is being followed with great interest.

Other methods for hindering cholesterol absorption, such as adding iron salts to the diet for the purpose of precipitating bile salts (which are known to be essential for cholesterol absorption) have been found to be effective in experimental animals but they have shown too much toxicity or too many side actions to be clinically useful (32).

An interesting attempt to *increase the rate of excretion* has been made by feeding concentrates of phrenosin (33), a cerebroside which was shown to be required in the intestinal conversion of cholesterol into coprosterol.

In spite of the fact that any decrease in the supply of exogenous cholesterol in the diet or in the efficiency of absorption, or any increase in the rate of excretion might be expected to stimulate a compensatory increase in the rate of hepatic synthesis, it should not be predicted that such measures will inevitably fail or be of no value. It can be argued that the average man differs from other mammals in exhibiting hypercholesterolemia. Great caution should be exercised in applying conclusions based on studies in normal animals directly to man.

However, a more fundamental approach to the problem of decreasing plasma cholesterol levels is by *affecting directly the homeostatic mechanism* that controls it. Among the various approaches to this problem now being attempted are: 1) administration of estrogens with the hope that the distribution between α and β lipoproteins will be affected, as well as the plasma level; 2) a low-fat diet which, for reasons not clear at present, appears to result in a decrease in the concentration of plasma cholesterol; 3) administration of thyroid hormone and related compounds, which may result in a decrease in the plasma cholesterol level by virtue of a change in the distribution between liver and plasma; and 4) administration of heparin, which has a striking effect in decreasing the high-S_f-value β lipoproteins and may increase the percentage of cholesterol in α lipoproteins, although it does not decrease the total cholesterol level. All of these methods have definite disadvantages and limitations; but even though no one of them is suitable for use on any except a research basis, it is hoped that they all may throw light on the nature of atherogenesis.

METABOLISM OF ARTERIAL TISSUE

One biochemical aspect of the atherosclerosis problem which has been greatly neglected is the metabolism of arterial tissue. Normal aorta has a definite, though low, rate of oxygen uptake (34) and is capable of oxidation of acetate to carbon dioxide, and of synthesis of fatty acids. In some species, cholesterol synthesis may also be demonstrated (35) but it seems unlikely that the large amounts of cholesterol deposited in atheroma are synthesized by the arteries.

Differences between arteries in their response to atherogenic plasma lipoproteins was strikingly demonstrated by Katz and associates who found in chicks that estrogens protect the coronary arteries from cholesterol-induced atherosclerosis while affording no protection whatever to the aorta or to other arteries (36). It is not yet clear whether such a marked differential effect occurs in humans.

There are many workers who believe that the primary event in human atherosclerosis is not lipid infiltration but is a breakdown in the elastic tissue which may be followed by lipid deposition. A particularly interesting development along these lines is the recent work on elastase by Balo and Bang (37) and by Lansing (38). Elastase is an enzyme which acts specifically on elastic tissue protein; it is said to convert this protein from a fibrous to a globular form and to make it soluble without hydrolyzing it to amino acids. Elastase is found in the islet cells of the pancreas, suggesting that it is a systemic enzyme rather than a digestive one. The elastase activity of arteriosclerotic patients has been reported as being a great deal lower than that of controls, although age differences were not ruled out. Confirmation of this observation will be of great interest, as will the results of experiments on the effect of injected elastase on atherosclerotic arteries.

SUMMARY

Much of the recent work of a biochemical nature on atherosclerosis has been concerned with the attempt to establish a correlation between the disease and some characteristic of plasma lipids. The level of total plasma cholesterol shows some degree of correlation but this compound consists of α and β lipoproteins, which differ greatly in composition and metabolic function, and is not a single biochemical entity. Barr and associates report a better correlation with the fraction of the cholesterol carried by the β lipoproteins, and Gofman and his group a better correlation with the concentration of β lipoproteins, giving more weight to those with S_f values above 12.

Other approaches to the atherosclerosis problem have consisted of studying the effects of various agents on total cholesterol or on α and β lipoprotein levels, and of investigations in the basic aspects of cholesterol metabolism, particularly with the aid of isotopic tracers, as a necessary preliminary to the investigation of lipoprotein synthesis and metabolism.

Specific topics which are briefly discussed include synthesis, absorption, distribution and metabolic pathways of cholesterol, a consideration of some of the factors involved in cholesterol homeostasis, the use of sitosterol or dihydro-

cholesterol to decrease plasma levels, of low-fat diets for the same purpose, and of estrogen administration to decrease β lipoprotein levels.

Recent biochemical studies on arterial tissue and on elastase are also discussed.

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OVERTREATMENT IN THE AGED*

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Should one lack autopsy material, some of the aged who have been subjected to active therapy may supply it promptly. The aged often die from drastic diagnostic procedures, massive therapy, or exaggerated care. No doubt too much of everything at times harms patients—visitors, conversation, baths, food, reading, drinking and smoking. This plea for restraint does not, of course, apply to severe infections or emergencies, when active measures and heavy doses of medication are necessary.

THERAPEUTIC NIHILISM

We have too often gone from one extreme to another in medicine. Most of us remember many fads—the accent on focal infections, unnecessary blood transfusions, doubtful vaccines, colonic irrigations, indiscriminate massage, and other therapeutic measures.

In the 1850's, therapeutic nihilism was prevalent. This led to hopeless resignation. Even in the early 1900's when Nascher was in Vienna, at a clinic for the aged he heard a professor say that the patient was suffering from old age and nothing could be done about it. Nascher spent the remainder of his life trying to disprove this statement.

This idea that nothing could be done for the aged still exists, but is not deep-rooted as it was earlier in the century.

I can remember in the early days of my practice—about 1911—that physicians often had little faith in their therapy. It was because of this nihilism that the cultists reaped a harvest. They still do, because there is a large field in medicine (for example, fibrositis, if that is the proper name for muscular rheumatism) not taken seriously by many physicians.

Preceding this period of nihilism, there was the era of blunderbuss therapy or "shot-gun medicine," involving formulas that left out nothing in the attempt to cover everything.

No doubt therapeutic nihilism saved many from blunderbuss therapy, and its often fatal consequences. Even today many patients do better with skillful neglect than with overtreatment.

VAMPIRE PERIOD OF MEDICINE

The stimulisms of Cullen-Brown in the 1780's were said to have killed more people than the French Revolution. Brown thought that the body was an inert mass and never able to take care of itself; it was always in need of stimulation by violent measures to give a continuous supply of energy. There was no scientific foundation for this approach.

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Salvesen (1) pointed out that a Silesian peasant in a mountain village had a cure-all that attracted so many patients that he became a millionaire. He treated various diseases with a form of hydrotherapy, both inside and out; he literally drowned people. Another peasant not far from this man, made a fortune by applying the opposite principle—a thirst cure. One nearly drowned the patient, whereas the other desiccated him.

Faddists still exist; they have a panacea for all ills. There was the Canadian who "cured" many ailments by twisting the feet and supplying shoes of his own manufacture. There are physicians who build up a reputation on "shots" of some sort, or some freak therapy which is not accepted by the medical profession.

SURGERY TAKES OVER

The era of pathologic anatomy and statistics, which made physicians so hopelessly resigned, was followed by surgery. The knife was the answer to all problems. The appendix, gall bladder, uterus, tonsils and adenoids were doomed. People were cut open at the slightest provocation. Many neurotic patients, looking for the cause of their aches and pains, not only yielded to a surgical operation but to many such explorations in their search for health. One sees today women of 45 who had eight operations between the ages of 19 and 30, and they are so battered with scar tissue that they have difficulty in carrying on. These patients were constitutionally inadequate in the beginning and the surgeon would have had more peace of mind if he had skipped the operations; but the patients demanded this type of treatment and the physician yielded to their wish.

PH.D'S HAVE THEIR INNINGS

The vitamin age, with everyone taking vitamins, has been in evidence for several years. First single vitamins were prescribed, then a combination of two or three, then five or six. Then the chemists became ambitious and added minerals. At the moment we have blunderbuss compounds containing so many ingredients that one tires before reading the formula. The mail order concerns compete with the pharmaceutical houses and duplicate their formulas as nearly as possible. Patients can treat themselves by consulting mail order catalogues.

This is not intended to discourage the use of vitamins in treating disease. There can be no question of the excellent results which often follow the use of vitamins. This article is written to warn against overtreating the aged, and applies to vitamins, surgery, physical medicine, and other forms of therapy as well.

THE PENICILLIN AGE

One easy way to treat patients is to give everyone a "shot" of something. Penicillin seems ideal to treat many conditions from colds to pneumonia. One takes a chance on penicillin, even though it is supposed to be harmless. This also applies to Aureomycin and other antibiotics. No one can deny the value of these agents but one can overuse them. Massive or too-frequent doses to combat mild infections are of questionable value.

In some cases doses have been gradually increased until violent reactions followed. The medical profession, like every other, is likely to go too far. This cycle brings up memories of the vampire age in which everyone was over-energized. It is the trend towards heavy methods of attack. Yet my homeopathic friends still carry on with their small doses and in many cases seem to get as good results as those of the other school.

THE PHYSICIAN HIMSELF

No doubt some physicians have instilled so much confidence into the patient and his family that their very presence in the sick room relieves the stress which causes overwork for the adrenals. I often think that if some of us did nothing for some patients except to give them confidence and hope, many patients would improve. Many rigorous examinations with negative results, and many treatments without benefit would be avoided. The hypothalamus which affects the pituitary and then the adrenals would be spared many alarm reactions and adaptation syndromes. Many of the complexities which arise consequent to the treatment of disease could be prevented if we did not use such treatment in the beginning. Patients are often relieved of their suffering if they have confidence in the physician. Hope is the most powerful stimulant we possess. All of us react quickly to good news whether we are ill or well.

ALARM REACTIONS AND ADAPTATION SYNDROMES

Salvesen pointed out that many of the older treatments had the same effect on stress as does modern therapy. Selye found that venesection causes an alarm reaction in human beings. Some of the older methods of hot baths and fevers in the antipenicillin days have been duplicated by modern methods of fever and shock therapy. Possibly the effects of widespread use of blood transfusions in surgery could be duplicated to some extent with the use of ACTH. Blood transfusions, if the blood is not properly matched, produce such an alarm reaction that the patient may not survive.

OVERSTIMULATION

These natural methods of causing alarm reactions are easily overdone in older people. Our methods of attacking disease are intense—examinations, fluids, drugs, to mention only a few. The patient must have a good constitution to withstand the onslaught. If we search for something to offset overstimulation of the adrenals via the pituitary, perhaps the wisest approach is to do nothing in the beginning which will cause a prolonged alarm reaction.

It is sad to realize that some people would be better off if they kept away from physicians who alarm them. They might live longer if they did not have their blood pressures taken at frequent intervals. Whatever the answer, moderation in all things is the keynote of success in treating the aged.

GENTLENESS IN GERIATRICS

In most instances, with the exception of some severe infections and serious emergencies, the older person will do well with about half the treatment given

to the younger adult (2). The senescent organism has been weakened by various infections and other diseases and the normal interrelationship of body organs has been disturbed because some are functioning better than others. On the other hand some elderly persons stand as much treatment as anybody; age does not seem to affect them.

In physical medicine half the usual frequency and dose of therapy may be adequate. Today we seem to be influenced by the dosage of medicine established in the advertising literature of some pharmaceutical houses. As a result the patient is made so ill (some antibiotics are examples of this) that both the physician and patient discontinue the drug entirely. There is something in the idea that if you take it easier you will last longer.

On two occasions I have seen elderly patients die a few hours after an exhausting examination. One patient had never recovered from a previous coronary attack. The other had a greatly enlarged heart and fluid in the chest; these conditions were discovered only after the roentgen films were developed. This woman was examined at 10 a.m. and died suddenly at 2 a.m. the next morning. She might have died anyway; nevertheless, she was literally scared to death before she was examined. Another patient nearly died following blood transfusions after surgery. One patient had a coronary attack following an electrocardiogram. Yet I notice old people doing square dances at the Wm. I. Sirovich Day Center, New York, and am told that they never get coronary attacks from such exercise. Perhaps this is because they seldom get attacks when they are doing what is a pleasure.

SMALLER DOSES OF MEDICINE

Many older people with genitourinary infections do well with 100 mg. of Aureomycin a day for ten days or 250 mg. once a day for three days if the infection is not too severe. I have found that 200,000 units of penicillin, or ⅛-grain doses of phenobarbital will sometimes give as good results as larger amounts. Patients with arteriosclerosis seem to stand such doses of phenobarbital better than larger ones. Repeated two or three times a day they sometimes take the sharp edges off the nervous system. Similarly, if one requires thyroid, ¼ grain often works better than 1 grain. Small doses of bromides (2 grains three times a day) are satisfactory. At times small doses of laxatives work better than larger ones. Each patient must be treated individually.

One advantage in small doses of drugs is that many of the disagreeable side effects are eliminated.

There is a Chinese saying, "Don't try to put out a fire of a load of hay with a cup of water." In serious illness the dose must be increased. The point I am trying to bring out is that we should use enough, but not more than is necessary.

CHANGING THERAPY TOO OFTEN

In some teaching centers where much research is carried on and laboratory tests are made so often that the patient becomes a human pincushion, the various members of the staff change the treatment every three hours. One man has an

idea and puts it into execution before the work has been completed on previous experiments.

Each one shows how scientific he is by instituting some therapy and then watching the effect on the eosinophils and lymphocytes, or observing if there is an excess of bilirubin in the blood or urine.

Many times simple observations would save many tests which almost invariably give negative results. By looking at the gloved finger after a rectal examination one can often tell if blood is present. Carefully kept weight records may tell us whether or not the patient is edematous. By looking at the tongue or touching the skin one can get an idea of the extent of dehydration. By asking a few questions we can often tell as much about the patient as the laboratory can. Our obligations to a patient are not discharged by having an electrocardiogram made or a few laboratory tests performed. The patient as a whole must be studied.

SUMMARY

An outline of fads in therapy is presented.

In general, indiscriminate heavy dosages of drugs increase autopsy material. Overdosage with antibiotics and other drugs is often followed by severe reactions and disagreeable after-effects.

Half the standard dosage often works well with the aged. This applies not only to drugs, but to physical medicine, massage, and other methods of treatment.

The exception is in severe infections or serious emergencies, in which massive therapy is indicated.

The physician's personality in the sick room should not be overlooked as an important factor in treatment.

Many of the complications which arise consequent to the treatment of disease could be prevented by not employing such treatment in the first place.

Many of the older methods of therapy, such as venesection, artificial fever, and hot baths had the same effect on the adrenals as present-day ACTH therapy.

Gentleness is the keynote in treating the elderly.

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PSYCHIATRIC THERAPY IN THE GERIATRIC PATIENT

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Remarkable changes have occurred during the course of the last fifty years in the relative numbers of patients in different psychiatric categories constituting the population of psychiatric hospitals. At about the turn of the century, a considerable proportion of patients were suffering from general paresis, but the discovery of the spirochete and the institution of curative and preventive measures have reduced the incidence of this condition to the extent that many young psychiatrists have never met the disorder. Following the advent of electroshock therapy in 1936, the chronically depressed patient no longer needed to wait for a spontaneous remission; and nowadays the duration of hospitalization has been reduced to much shorter periods so that a large number of beds, and indeed wards, previously assigned to depressed patients have been turned over for the care of other types of illnesses. In fact, many such patients, now able to receive electrotherapy in the office, do not require hospitalization. For decades, because of the early age of onset and of the poor prognosis, schizophrenia has been the category under which the greatest number of patients have been admitted and under which the largest number of patients have been hospitalized. Insulin shock therapy has had marked effects in shortening the duration of hospitalization of many schizophrenics, even though adequate follow-up studies now becoming available appear to indicate that the number of long-term "cures" is not significantly greater than in untreated cases (1).

In recent years another change has been occurring in the distribution of the population of mental hospitals—a change that will probably produce results of major significance not only medically but also socially, politically, and economically. With the distinct increase in life expectancy due to the many advances in other fields of medicine, psychiatry is being presented with a problem for which, with conventional attitudes, there appears no answer. The number of patients admitted to hospitals with the diagnosis of senility and arteriosclerosis ("organic" disorders) has been rapidly approaching the number admitted with the diagnosis of schizophrenia (2). Whereas insulin shock therapy offers some hope for schizophrenics, it has been customary to look upon senile or arteriosclerotic patients as entering the hospital for purely custodial purposes until illness and death remove them from the hospital ward.

THE ELDERLY PSYCHIATRIC PATIENT

The urgency of this problem has stimulated some workers to study more intensively the psychiatric patient in the later years of life, and in a few centers a more optimistic therapeutic approach has opened new avenues in the treatment

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of such patients. Closer attention to the clinical picture has emphasized the need to place in different diagnostic groups those patients suffering from purely psychogenic conditions and those in whom definite organic impairment can be demonstrated. With this emphasis on the psychologic aspects, examination of the etiologic factors which have precipitated emotional disorders in the aged has brought about a realization of prognostic potentialities. The myth has too long been prevalent that about the age of 65 the human being begins to show organic cerebral changes of a degenerative nature and that emotional disorders occurring after that age are, therefore, the result of such pathologic conditions. Because of the assumed organic impairment, a psychotherapeutic approach has been deemed useless. Physical infirmities such as cardiac disease or osteoporosis involve increased risk in the application of electroshock treatment. Moreover, the fear that electroshock treatment might itself increase cerebral damage has been a consideration causing even the most eager hand to hesitate before pressing the button.

PSYCHOGENIC FACTORS

However, the new optimistic approach to these patients and the application of positive therapeutic techniques have revealed fallacies in the long-held opinions. It is true that many patients after the age of 65 do show some evidence of organic brain disease, but the large part played by psychogenic factors in the production of symptoms has been overlooked. It has been conclusively shown that there is no correlation as to type or severity between the clinical symptoms and the autopsy findings, and the conclusion is forced that etiologic factors other than simple organic change are of major significance in the production of the clinical syndromes. Grouping together all patients suffering from psychiatric disorders after the age of 65, three groups may be delineated (3):

1. Those patients in whom the psychogenic factors are of maximal significance, though minimal degenerative processes may be present.

2. Those in whom the psychogenic factors are of major importance, though such factors may include the psychologic reactions to the results of organic impairment.

3. Those in whom cerebral degenerative pathology is so extensive that the capacity of the brain to return to relatively normal functioning is grossly damaged.

The psychiatric symptoms attributed to organic cerebral change include memory disturbances, circumlocution, disorders of attention, inability to elaborate, confusion, and regressive changes such as deterioration in personal hygiene. In many patients with these findings, objective neurologic responses are rarely significant and often unobtainable. It has become axiomatic, therefore, that the intellectual functions are more susceptible in early organic pathologic conditions. That this generally accepted viewpoint requires careful re-evaluation in light of the relatively mild mental symptoms which may follow vascular accidents is further emphasized by consideration of the close similarity in clinical picture between the deteriorating process of the withdrawn schizophrenic and that of the withdrawing elderly patient.

It should be more widely recognized that emotional stress imposed on elderly people by demands to readjust to completely new life situations produces psychologic reactions comparable to those caused by the emotional stress imposed on adolescents by demands to adjust to adult life. That many succumb to emotional disorders because of psychogenic rather than organic factors is not a revolutionary idea when it is remembered that some very active men die within a year or two of retirement, apparently as a result of the loss of motivation to continue. Even though limited by organic changes in the capacity to readjust, many older people would do so if the psychogenic factors could be modified in the appropriate way.

The idea of organic etiology is, however, easier for the physician. Thus, though Alpers has shown that there is but a 30–40 per cent correlation between the presence of retinal arteriosclerosis and cerebral arteriosclerosis (4), the presence of the former continues to result in the diagnosis of the latter. In each case a fresh consideration of possible psychologic factors should always be uppermost before classifying the patient as an organic problem. It is clear that many patients in the older age groups are, in fact, suffering from psychologic illnesses arising from change of social and occupational status, economic stress, and constriction of opportunities to gratify their emotional needs. The therapeutic approach in the treatment of the aged is now as wide in its orientation as is the treatment of younger patients. The emphasis is directed to the prevention and the early therapy of psychiatric conditions as well as to the treatment of those disorders which have progressed to the point where the patients require hospitalization.

PSYCHOTHERAPY

In the early stages of psychopathologic processes in later life, it is difficult to determine how much is organic and how much is psychogenic. Clear-cut affective conditions such as depression, anxiety, elation, or apathy present no difficult problem in diagnosis. In many the withdrawal from interpersonal relationships becomes manifest by accentuated preoccupation with functions or parts of the body, resulting in complaints of a somatic nature; since the aging body may function less efficiently in the various physiologic systems, the physician must be constantly on the alert so that he can recognize the presence of psychogenic as distinct from physical symptoms. A thorough physical investigation, including all laboratory studies which appear pertinent, is necessary if the physician is to rule out gross organic pathology in the area which is the focus of the symptom. When the *physician* is convinced, the information must be conveyed to the patient in a manner acceptable to the latter; that is, so that he does not feel that his complaints have been decried or disregarded. The importance of the effects of emotions on the body should be explained, as should the tendency of the patient to focus attention on bodily functions. Stress should be placed on therapy directed towards recognizing the reasons which have caused the patient to become preoccupied with his body and to the remedying of the emotional situation.

When reassured by thorough physical examination and educated in the

psychologic aspects of their condition, most patients are willing to undertake investigation of their emotional difficulties and to participate in therapy to resolve them. The recommended plan of therapy is to place emphasis on revealing the psychologic background of the current situation, using reassurance, explanation and suggestion on a constructive basis as the main methods of dealing with the problems. In order to understand the difficulties facing the patient, a complete history is essential; in addition to that provided by the patient, information provided by members of the family or by others closely related with him may be of inestimable value in the rapid evaluation of personality changes and of the significance of the symptoms in relationship to the drives and the self-esteem of the patient. With increasing age, many of the long-held goals cease to be attainable and, therefore, re-examination of these aims is an important part of therapy. The acceptance of the abandonment of some ambitions is rendered easier by the encouragement of activities which offer substitute gratifications. The acceptance of standards lower than those hitherto held must be developed, and participation in activities in which the individual's potentialities may be realized must be furthered.

In psychotherapy of the aged, deep uncovering therapy which is likely to rearouse conflicts arising from instinctual drives is not to be lightly undertaken. The limitations imposed by age on adaptability and readjustment are frequently such that deep investigation may arouse emotions of such strength that they are beyond the patient's control. Even without the efforts of the therapist, many older patients experience a recrudescence of problems satisfactorily dealt with for many years—witness the increase in sexual offenses in the later age groups. To re-awaken such conflicts may result not only in increased anxiety but in action with subsequent guilt. Dangers of which the physician should be aware are either total withdrawal from treatment, or the development of emotional reactions beyond the patient's control. It may be that in the future, with the development of new techniques, such possibilities need not be feared; but at present it should be realized that when an individual has made a reasonable adjustment, little can be gained by adding further stress to that which already exists.

The application of group therapy has now been extended to the older age groups, both in preventive as well as therapeutic procedures. Valuable work by Linden (5) at Norristown State Hospital, based on psychoanalytic principles, shows how much can be achieved with the older patient. As with younger patients, the provision of a planned routine is important. Encouragement of participation in activities suitable to age and physical condition enables the patient to re-establish emotional relationships with others. Opportunities for recreation and socialization with people of similar age are also conducive to the formation of groups in which emotional problems may be discussed with interruption of withdrawal patterns.

PHARMACOTHERAPY

In addition to other forms of approach, many adjuvant forms of treatment have been recommended over the course of the years. Anxiety, which is of particu-

larly common occurrence, frequently requires the use of small doses of a sedative, of which there are many kinds. The fact that older persons are susceptible to the cumulative effects of barbiturates as well as of bromides is, of course, well known to physicians, so that much smaller doses of drugs should be used when administered over a long period of time. In some old people barbiturates tend to have a stimulating or exciting rather than a sedative effect, and this is particularly true of the long-acting members of the barbital group.

Some years ago much hope was held out that the use of vitamins would be of great benefit in the elderly psychiatric patient. Older people, especially those living alone, tend to become indifferent to the preparation of food and, as a result of restricted diets, vitamin deficiencies develop. Nicotinic acid and other vitamins of the B series have been shown to be valuable, though only when nutritional factors are of major significance. Recently there has been a revival of the potentialities. Vitamin B_{12}, administered to confused patients in doses of from 500 to 1,000 micrograms for about a week, appears beneficial in many, as does the combination of nicotinic acid and oral Metrazol (6, 7). Use of the intravenous route for administering Metrazol as a convulsive agent in shock therapy of younger people has been almost abandoned, but oral administration in doses of 1½ grains three or four times a day has been claimed to produce considerable improvement in the confused geriatric patient (8). The claims for these and other preparations are as yet unconfirmed. There seems little doubt that in a considerable number of patients they may play a role in the elimination of fatigue and confusion, in producing some elevation of mood, and in improving the mental and physical capacities to the extent that the patient is stimulated to participate in a more active program.

SOMATIC THERAPY

In the more severe emotional disorders of the aged who require hospitalization, a less conservative approach appears indicated. As stated earlier, it is recognized that purely affective conditions may occur in older age groups without any significant association with organic impairment. For a number of years, some such patients have been receiving treatment by electroshock therapy and the administration of muscle relaxants of the curare group. Attendant on the use of curare are added dangers—in addition to the anxiety which paralysis may produce, death as a complication has been recorded on a number of occasions. Recently the introduction of the succinyl-choline group of muscle relaxants (which operate in a manner completely different from the curare group) promises to make treatment of older people much safer and to extend the possibility of therapy to those who would not previously have been considered. Succinyl choline (9) is a short-acting drug which is quickly destroyed by the body, so that an antidote is not necessary; in competent hands its administration so far appears completely safe, and it can be utilized to the extent of absolute relaxation so that the mildest tremor of the facial musculature is the only evidence of convulsive seizure. Without evident effect on involuntary or cardiac muscle, it enables electroshock therapy to be safely administered in patients with such conditions as cardiac failure, discogenic disease, severe arthritis, or osteoporosis—

and even in a case of long-standing chronic subluxation of a cervical vertebra. Moreover, the artificial oxygenation of the patient and consequent elimination of cyanosis maintains, as far as is known, an adequate $O_2 \rightleftarrows CO_2$ exchange in the tissues, thus eliminating the fear of increased cerebral damage due to anoxia. On the basis of physical condition alone, few, if any, patients are unsuitable for electroshock therapy when the latter is psychiatrically indicated. In a series of cases of elderly patients who presented obvious signs of organic deterioration, such as memory loss, carelessness in hygienic habits, confusion, and disorientation, the use of electroshock therapy with Pentothal and succinyl choline produced definite improvement, sometimes with the disappearance of the memory loss and frequently of the incontinence and other symptoms. Moreover, many of these patients were then able to participate in an active program and to relate themselves to others. The use of maintenance treatment at intervals of one to two weeks enabled some patients to be kept active who would otherwise have tended to deteriorate to a marked degree.

PREVENTIVE MEASURES

With more people living beyond the age at which major changes in adjustment must be made, it is imperative that greater attention be paid to the provision of opportunities to make the adjustment possible. Retirement from employment may mean not only disruption of life-long patterns but also loss of self-esteem; not only loss of economic independence but also loss of opportunity to continue pursuits of psychologic value to the individual. The death of the marital partner and of friends and associates brings not only the threat of illness and death, but also restriction of the interpersonal relationships. Constriction of interests in the present leads to preoccupation with the past, and this in turn leads to further loss of communication in the present. These regressive trends appear much more important in many older persons in accounting for some of the signs of dementia than does the actual organic impairment—certainly the recovery of memory, the clearing of confusion, and other improvement which may be obtained by electroshock therapy appears to bear out this hypothesis.

The establishment of clubs for the older age groups is a positive measure, both in terms of the activities available and in increasing the opportunities for the development of wider interpersonal relationships with men and women of like age and similar interests (10). Such clubs may provide activities of a social, recreational and avocational nature, stimulating the development of talents, either only partially exercised or not even hitherto recognized. Through such associations, satisfactory substitute gratifications may be achieved, sufficient to make the new life rewarding.

A fundamental cultural attitude which ultimately lies at the root of the unhappiness of older people is the belief that youth and progress go together and that progress is only good; as a corollary, the aged are useless and may, therefore, be discarded. Only when present-day society alters this point of view and when its constituent members see the later years of life as a period bringing respect, relaxation, and an opportunity for useful activity, will the real preventive goal have been achieved. This is the major educational task before us.

SUMMARY

With an increasing incidence of psychiatric disorders designated "due to senility and arteriosclerosis," the past emphasis on the organic aspect as the fundamental etiologic factor is questioned. Emphasis on the importance of psychogenic causes introduces an optimistic approach with stress on active treatment for all types of illness. Various therapies are discussed.

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BACTERIAL ALLERGY AS A CAUSE OF SO-CALLED INTRINSIC ASTHMA IN THE ELDERLY PATIENT

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METHOD

Some six years ago, in association with Dr. F. A. Nantz, one of the authors (H. B.) developed a test for bacterial allergy (1–7) based upon the observations of Rich (8–10) that the lesion produced by this type of allergy is one which does damage to the sensitized cell. The test itself consists essentially of suspending the white blood cells of a patient in filtrates of various strains of bacteria. If, at the end of seventeen hours' incubation, a considerable number of the patient's leukocytes have been damaged or killed, the result of the test is taken to mean that the patient is allergic to that particular strain of bacteria from which the filtrate comes. To avoid error the reaction is repeated three times. The readings in each of these three tests must be consistent before the result is reported as positive. The results are read and recorded as negative when few, if any, cells have been affected; 1 plus when 10 to 25 per cent of the cells have been damaged; 2 plus when the affected cells are 25 to 50 per cent; 3 plus when they constitute 50 to 75 per cent; and 4 plus where all or nearly all are damaged or killed (1–7). This test has been published in detail several times.

It has been the practice of one of us for about twenty years to use, for testing patients suspected of having a bacterial allergy, vaccines of pure cultures of the common respiratory bacteria. With this method we sometimes noted immediate reaction in the form of wheals or hives similar to those obtained with a protein extract of an inhalant or pollen (11). This represented an atopic form of allergy. In most cases in elderly people, however, especially those in whom asthma had recently developed and who gave no personal or family history of hay fever, perennial coryza, hives, atopic eczema, migraine, or gastrointestinal allergic manifestations, we observed a delayed inflammatory reaction. We obtained a similar reaction in atopic individuals who had chronic respiratory infections over a considerable period of time along with their atopic manifestations. Contrary to what most allergists believe, for Forman these positive tuberculin-like responses to bacteria have been significant. It is true that in the inflammatory reactions, as in the wheal reactions, the positive result may represent an historical note relative to some other factor in the patient's life and so it has no significance in identifying the offending allergen which causes the complaint.

There were many instances in our series, however, in which it was felt that a bacterial allergy was present along with the infections; but in these patients no positive reactions to bacterial vaccines were obtained. It was for this reason

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that the senior author began to use the Blatt-Nantz test for the diagnosis and treatment of such patients.

The authors have satisfied themselves that the method of Blatt and Nantz is reliable for the diagnosis of bacterial allergy and the identifying of the specific strains of organisms to which the individual is allergic. This has been repeatedly confirmed by the number of patients greatly improved or rendered free of their symptoms by the use of carefully graduated injections of dilutions of the filtrates from the offending organisms (12–14). When this occurs, the leukocytes of these patients are no longer susceptible to the filtrates which at the beginning consistently damaged them.

RESULTS

In the management of the elderly patient with asthma, this method of testing and treatment has been especially helpful. It has also served to identify the allergen in a number of patients with so-called *intrinsic asthma*, and to determine that these cases were, in fact, instances of bacterial allergy. In this way the test has made a distinct contribution to the whole subject of clinical allergy. It has helped to establish the existence of bacterial allergy to organisms other than the tubercle bacillus.

Asthma

Elderly patients with bronchial asthma to whom this test should be applied fall into two groups:

Group I

These are atopic (hypersensitive) individuals with the usual extrinsic asthma, in whom over a period of years infections have developed in the nasal sinuses and bronchial tubes. Along with these complications, after a certain time, specific hypersensitive reactions to certain of the infecting bacteria have arisen. These patients, as a rule, will give positive reactions to skin tests for the usual inhalant atopens (such as pollens, danders or dust). With the elimination of these allergens or their gradual injection in a properly planned hyposensitization program, considerable improvement should result. In a relatively few instances, in our experience, the use of the elimination-substitution-identification dietary program of Rowe (15) may likewise bring about similar improvement. However, in cases such as discussed in this paper, there is always a residue of asthma and recurrent relapses. When blood from these patients has been subjected to the Blatt-Nantz test and treatment carried out with appropriate filtrates, the results have been most gratifying.

Case History. A female, aged 60, had bronchial asthma since 1939, following an attack of influenza. There had been frequent attacks of quinsy when she was younger. Some years previously there had been an infection of the toe followed by phlebitis. The extraction of a tooth two weeks before she was first seen had apparently made her asthma much worse. She had no other manifestations of allergy and the only instance in her family history was in one of her grandfathers. In the past she had been given complete "allergic work-ups" by

several physicians. She had had several series of injections of house dust and had carried out meticulously her physician's instructions about house dust control, with no improvement. Physical, x-ray, and laboratory findings of the condition were typical but otherwise not unusual. Skin tests revealed that she reacted to dog and cat hair, wool, and spores of homodendrum. The administration of iodides and antihistiminics did not improve her condition. Blatt-Nantz tests gave results which were consistently positive to two group A strains of hemolytic streptococci and Type I pneumococcus. She was given graduated injections of filtrates from these organisms. On several occasions her arm became quite sore after an injection and on one or two occasions the injections produced a mild asthma. At these times dosage was adjusted by proper reduction and gradual return to the regular schedule. When the dosage finally reached 0.10 cc. of 1:10,000 dilution, her chest became free of rales and it has remained so. At the end of this series the Blatt-Nantz tests were repeated and the results were found to be negative. So far, the asthma has not returned.

Group II

The second group consists of the non-atopic individuals with so-called *intrinsic asthma*. They do not show a positive response to skin tests and there is evidence of infection in the respiratory tract. The presence of a bacterial allergy should be suspected at once. In most instances of this kind many of the patient's leukocytes are unable to remain alive for seventeen hours when suspended in filtrates from certain strains of bacteria. If a *desensitization* program is carried out with these specific filtrates, the results as a rule are good.

Case history. A female, aged 55, had her first attack of asthma at 45 years of age. Several months before that she had had a severe attack of influenza. This was followed by bouts of explosive sneezing and running of the nose, and then by a thick, yellowish post-nasal drip and attacks of frontal headaches. At first, the asthma had been mild and had occurred only with damp weather, although she had a feeling of tightness across the chest most of the time.

In her personal and family history there was no mention of allergic manifestations. The physical examination revealed an asthenic female with a reddened pharynx and thick yellow secretions in the post-nasal space. Roentgenograms showed increased peribronchial markings and some haziness of the sinuses.

She had been on elimination (allergy) diets and a series of injections of autogenous vaccine. In July 1948, the Blatt-Nantz test was applied to her white blood cells. The findings were positive for streptococcus viridans and for a Sonnei strain of bacteria. Treatment was begun with 0.10 cc. of a 1:1,000,000 dilution of these filtrates. The dose was increased by 0.10 cc. and was given twice weekly. When 0.70 cc. was reached, she responded with a marked delayed reaction. The same dose was repeated until well tolerated. Similar reactions occurred several times during the course of her treatment. There was no clinical improvement until a dose of 0.10 cc. of the 1:10,000 dilution was reached. She then became free of asthmatic attacks. By the time she was getting 1:10 dilution, the suspension of her leukocytes was consistently resistant to the same filtrates that had damaged or killed them at the beginning. Subsequent periodic tests have given negative results. She was last examined in December 1953, and found to be free of asthma and post-nasal drip.

DISCUSSION

In the elderly patient with bronchial asthma, bacterial allergy, as revealed by the Blatt-Nantz test, frequently plays a major role. It is in these cases that the test proves especially helpful in providing the physician with a specific filtrate for desensitizing the patient. Consequently, this method of testing and treatment not only is of great value in dealing with so-called intrinsic asthma but also in

the treatment of the elderly atopic patient in whom, over the years, atopic allergy has been complicated by bacterial allergy. In intrinsic asthma it furnishes for the first time a specific desensitizing agent. In the elderly atopic patient whose condition is complicated by bacterial allergy, it is thus possible to get results from treatment that are superior to those obtained by hyposensitization with the offending atopens alone.

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DEVELOPING A GERIATRIC SURGICAL SERVICE

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The Welfare Hospital of New York City opened its doors in 1939 under the administration of Dr. Samuel S. Goldwater as Commissioner of Hospitals. It had long been his ambition to provide for the City a hospital exclusively for the care of patients afflicted by chronic disease. Such patients were to be found in large numbers in all the city hospitals, run aground on the shores of the stream of active and acute cases which constantly flowed through the wards. Long since diagnosed and classified as "chronics," their treatment often standardized and unchanging, they naturally presented little challenge or interest to the professional staff whose time and attention were fully claimed by the active cases on their services. These chronic cases, too, occupied for long periods of time beds badly needed for the accommodation of more acute cases. Dr. Goldwater's idea was to collect these chronic cases in one hospital where they might become the object of intensive study, research, and whenever possible, effective treatment of remediable conditions. Hence the establishment of Welfare Hospital, later in his honor to be renamed the Goldwater Memorial Hospital.

At the opening of the hospital the usual run of chronic surgical cases soon filled our wards with many challenging problems. What gave our service its distinctive character and special interest was the fact that almost all our patients were old people. Among our admissions, both at first and later, the patient under 60 was a rarity. Our oldest patient was 102, and the average age was 74. We were undertaking, unexpectedly, a surgical geriatric service.

None of our staff had any intensive experience in the surgical care of old people. The word "geriatrics" was not commonly heard in those days and the specialty was hardly in its inception. We were daily faced with concrete problems of surgical care in patients of advanced age. What we learned during the succeeding twelve years was largely acquired by observation and by practical trial-and-error experience.

CLINICAL MATERIAL

The patients with whom we had to deal almost without exception presented the effects of degenerative disease. Alone, or in a combination of ailments, we found them suffering from arteriosclerosis, myocardial disease, nephritis, diabetes, lues, tuberculosis, various forms of anemia, a variety of central nervous system lesions from hemiplegia to Parkinson's disease, advanced arthritis, obesity, cachexia and the whole gamut of nutritional and vitamin deficiency states. In many of them, contractures and decubitus ulcers had developed.

The surgical conditions from which these patients suffered were equally varied. Among the chronic conditions were unhealed fractures (particularly of the hip),

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hypertrophy of the prostate, hernia, tumors (especially cancer), cholecystitis, gastric and duodenal ulcers, varicose ulcers (often of tremendous size), ulcers and local gangrene from arteriosclerosis with or without diabetes, visceral and osteomyelitic sinuses and deformities from contractures and arthritis. Among the most frequent of the acute conditions were gangrene of the extremities, fresh fractures, cholecystitis, common-duct obstruction, intestinal obstruction, appendicitis (rarely), urinary retention, and bleeding or perforated ulcers of the stomach or duodenum.

APPLICABILITY OF SURGERY

At first, knowing that these elderly patients represented poor surgical risks, we were reluctant to undertake operation except in the most urgent cases. Yet we were often confronted with the alternative of emergency operation or of abandoning the victim to inevitable death from his ailment. Fifty-six per cent of those on whom we operated stood the emergency surgical procedure well and recovered. We learned that although patients of this type would tolerate surgery better than we had supposed, they would succumb more rapidly and certainly than would younger individuals if relief of the threatening condition were not promptly brought about. They could not stand infections, obstructive lesions, pain or loss of blood for long if they were to survive. We learned that our diagnosis and preparation must be rapid, our operation as prompt and as atraumatic as possible, and the procedure itself restricted to only what was absolutely necessary to relieve the existing emergency. These factors, as we found by studying our mortality and results, were more important in determining the immediate outcome of acute emergencies than were the factors of age and pre-existing disease.

As these findings were confirmed by experience, we began to take a more hopeful view of the applicability of surgery to the more chronic conditions from which these old people were suffering. We found that with improving preparation and after-care our results justified the undertaking of remedial operations in chronic cases for the relief of discomfort, the alleviation or cure of life-threatening conditions, or for the restoration to reasonable health of those otherwise condemned to chronic invalidism.

Fractures. Among the first results of our changing attitude was the classification of fresh fractures, particularly those of the femoral neck, as acute surgical emergencies. When first our wards were opened, unhealed fractures of this type represented about 30 per cent of our admissions. Most of these patients were bedridden, suffering pain when moved, and often afflicted with bedsores and contractures. These were the tough survivors of long periods of treatment by sand-bags or traction. We determined to employ the Smith-Petersen nail, then recently introduced, for emergency internal fixation. Since our wards served the City Home as well as other wards of our own Hospital, we were soon receiving a fair number of these fresh fractures. Following rapid preparation, these patients usually came to operation well within twenty-four hours following injury.

The results of this program were gratifying. The mortality was low, compli-

cations were diminished, and most of the patients were sitting comfortably out of bed on the day following operation. Seventy per cent eventually secured firm weight-bearing union. Later we adopted the plan of treating pertrochanteric fractures of the femur also by the open method of pinning and plating with similarly satisfactory results.

Other surgical conditions. As our concept of operability broadened, we used surgery more and more for the relief of conditions falling within the chronic category. Large hernias, particularly femoral hernias and others threatening incarceration, were repaired; gall bladders subject to repeated attacks of cholecystitis were removed; choledocholithotomy was performed when needed; resections of the stomach for the complications of ulcer there or in the duodenum were undertaken; and radical surgery was performed for cancer wherever it might be found. Prostatectomies were common and usually well tolerated. Orthopedic procedures also were carried out in favorable cases for the stabilization of ununited fractures (especially at the hip) and the relief of severe contracture deformities. Many disabling varicose ulcers were healed by appropriately staged surgery.

In this acute group of cases we learned that the simplest possible operation was best. Thus, for example, in acute cholecystitis we confined ourselves to cholecystostomy, a brief experience with cholecystectomy during acute attacks having shown a much higher mortality (62 per cent). In acute obstruction of the large bowel we employed colostomy or cecostomy. Once the emergency was past, definitive corrective surgery could be more safely and effectively undertaken later with adequate preparation.

PREOPERATIVE PREPARATION

We came to know the great importance of proper preoperative preparation. If operation for a chronic condition were in prospect, the correction of nutritional and vitamin deficiencies and the restoration of a normal fluid and electrolyte balance were required. In obesity, weight reduction was often necessary. Diabetic states had to be brought under control, tertiary lues treated, defective kidney function ameliorated, and abnormal hypertension reduced. Cardiac function was carefully evaluated and appropriate treatment instituted. Anemia, a very common occurrence, usually required therapy. Often preliminary blood transfusions were employed. We found that patients supported by transfusion tolerated surgery better than those who did not receive blood. We came to use it liberally, although we did not learn until the later years the significance and common occurrence of blood volume deficit in this type of patient, nor had we means of measuring it. The Evans Blue method eventually proved a valuable guide. Important also was the psychologic preparation of the patient. A spirit of optimism, hope and a will to recover were assets of great value and every effort was made to foster these attitudes.

This type of thorough preparation served well when time permitted, but when there was an acute surgical emergency it could not be used. The best that could

be done was to combat and overcome shock, to supply fluids, electrolytes and blood, to support the heart as needed, and proceed. We learned that a natural desire to bring the patient into the best possible condition might defeat its purpose by the loss of valuable time. These patients deteriorated so rapidly under the impact of an acute surgical emergency that the opportunity for its operative correction might thus be lost.

OPERATION

The work of the surgeon came, as the result of our experience, to be guided by certain principles. In both acute and chronic cases, we learned that the procedure should be the simplest and most direct that would accomplish the desired object, and that accuracy and gentleness in the handling of tissue was of greater importance than speed. Respect for tissue, sharp dissection, accurate and complete hemostasis, minimal manipulation coupled with such rapidity as was consistent, came to be our operative criteria and our results improved in the degree that we followed them. The prompt and adequate replacement of blood lost during operation proved our best safeguard against shock and was valuable for support during the procedure. We learned to use it more liberally than the amounts one would expect to use in younger and more vigorous patients.

ANESTHESIA

The question of choice of anesthetic gave us considerable concern. We found spinal anesthesia undesirable, in general, in this type of patient. Its introduction was difficult, particularly, as was so often the case, when the spine was stiff and arthritic. Consciousness during operation was another undesirable feature. The marked blood pressure changes which occurred, particularly in hypertensive patients with cardiac and renal damage, were dangerous. Ether was a safe and reliable anesthetic. We had recourse to it particularly in the hazardous case. We did not find that operative pneumonitis was incurred by its use. The difficulty of induction in the early days was one drawback. We did not like to use nitrous oxide because of its anoxic effect. With the later introduction of pentothal this problem was simplified. Of all the inhalation anesthetics, we came to depend most on cyclopropane. The induction was easy, relaxation good and recovery prompt. It permitted and encouraged a good supply of oxygen to the patient. In leg amputations for gangrene, we undertook a series of cases employing the crymal anesthesia of Crossman. This we abandoned largely because of the undesirable effect of the tourniquet, which resulted in non-healing stumps and a high incidence of thrombosis and embolism from prolonged vein-compression. This method still found a use in the occasional case of fulminating cellulitis of the leg with diabetes, in which it proved a valuable means of segregating the extremity during the time required for preparation of the patient, controlling the diabetes and procuring blood. We used local infiltration anesthesia when the nature of the operation and the temperament of the patient permitted. We came to use it a good deal in the repair of hernias. During the twelve-year period we

had but one death directly attributable to anesthesia. This occurred under spinal. When the agent was properly selected and well given we no longer considered anesthesia a serious hazard.

POSTOPERATIVE CARE

We have always considered postoperative care to be of crucial importance. During the early hours following surgery, shock was apprehended and if possible forestalled by further transfusion and other supportive measures. The electrolyte and fluid balance were maintained, but with care not to overburden a compromised heart by too rapid administration. Vitamins and protein hydrolysates were added as needed to correct deficiencies. When kidney function was below par, great care was exercised to avoid overloading the body with salt. All of this work was carefully controlled by repeated laboratory tests. We found that oxygen administered in the early postoperative hours greatly helped these people, maintaining good color, lessening respiratory effort and easing the labor of the heart. We came to use it liberally, almost as a routine measure. Morphine and other sedatives were kept at minimum dosage. Moving and turning the patient were practiced, but we learned the necessity of gentleness in their performance and the value of not overdoing this disturbance until circulatory stability had been established.

Dreading hypostatic congestion of the lungs, we made it a practice to get these elderly patients out of bed at the earliest possible moment consistent with their strength and the nature of the operation. This practice antedated considerably the vogue for early ambulation.

At the start of our service, penicillin and the succeeding host of organic antibiotics had not as yet been introduced. The use of the sulfa drugs was confined almost entirely to the combatting of infection or the treatment of established pneumonitis. When penicillin became available we began to use it in the immediate preoperative preparation as a prophylactic measure, and continued it through the first four or five days of the postoperative period. The result was a somewhat lowered incidence of postoperative lung complications, but this change was by no means as striking as we had anticipated.

Although atelectasis was of fairly common occurrence, it was usually controlled by bronchial suction and its effects were of short duration. Pneumonitis accounted for a third of our deaths. Half of the cases of pneumonia occurred ten days or more after surgery. Embolism was a significant cause of early fatality. Fifty per cent of the postoperative morbidity and mortality was the result of heart failure, coronary occlusion, cerebral vascular accidents, or failure of renal function. Since most of these complications were late in developing, we came to believe that they were related rather to the pre-existing condition than to the operation itself. Undoubtedly, particularly in the acute emergencies, the operation and the condition for which it was performed were the predisposing factors.

In the earlier years we had no means of controlling the development of phlebothrombosis and no other method of forestalling embolism than ligation of the superficial femoral vein. Later, when heparin, Dicumarol and other anticoagu-

lants were introduced, we employed them both therapeutically and prophylactically. Our early enthusiasm for the free use of these drugs was somewhat dampened by the observation that their effect (especially that of Dicumarol) was likely to get out of control in these old people and to bring about hemorrhagic states, even when used in small doses. These hemorrhages were persistent and obstinate in spite of withdrawal of the drug, transfusion and vitamin K therapy. We used Dicumarol less and less and depended more on depoheparin in thrombotic conditions. An important prophylactic measure against the propagation of thrombi was the careful handling and accurate ligation of vessels, and the avoidance of the traumatizing tourniquet.

NURSING

The successful operation of a geriatric surgical service is in no small measure determined by the quality of nursing care. Sick old people require a great deal of attention, as well as close watch over their condition and an alertness to its changes. Often they are relatively helpless, must be assisted even to turn in bed, and frequently have to be fed. Getting them in and out of bed requires much labor. They need help with toilet matters; often they are incontinent. The prevention and treatment of bed sores requires much care. Frequently these patients are reluctant to eat, and must be constantly plied with fluids and coaxed to take them or they will become dehydrated. They tend to be depressed, irritable, suspicious and uncooperative at times, so require cheerfulness, tact, gentleness and understanding on the part of those who handle them. Nursing them is difficult, but nowhere are the results of good nursing more important or more rewarding. It is the part of the surgeon to sustain and encourage the nurses in their work, recognizing its importance and appreciating their efforts.

THE PHYSICIAN AND HIS TRAINING

We have learned that the doctor's own attitude towards the patient is of fundamental importance. It must instill a feeling of confidence, hope and a sense of personal sympathy and interest. Without this response his efforts will fail of their best results.

These things the young doctor must learn as part of his education in geriatric surgery. It is our firm conviction that the teaching of geriatric surgery should be intensive rather than incidental. It should be taught as a fairly exclusive exposure over a period of time, rather than by the incidental observation and care of an occasional elderly patient in the midst of a busy general surgical service. This training should occur when the young man is already well grounded in the fundamental principles and technics of surgery. It is best to be given at the Resident or Assistant Resident level, not lower. In a period of at least six months, or preferably a year, the young doctor will, by day-to-day precept and experience, gain some insight and skill in this special field of work. He will find a different type of surgery from that which he has previously encountered. The problems of diagnosis are often obscure and complex. Therapy must be modified according to the particular situation and the more or less precarious status of each patient.

Judgment in these matters can only be acquired by adequate experience under competent guidance and instruction. He must learn the application of surgery and of laboratory criteria to patients who are already old and sick—not, as hitherto, to relatively sound individuals suffering only from an ailment subject to surgical treatment. The difference is fundamental. The technical performance of his surgery must be refined, delicate, atraumatic, accurate, and preferably rapid. He must learn to make relief and survival his objectives rather than the performance of an ideal operation. Our service has been most effective in teaching, when we could provide a full year of residency at the postgraduate level, following a half-year of assistant residency. With the gradually increasing age of our population, the value and necessity of such training in geriatric surgery are becoming every day more apparent.

REHABILITATION

As our experience grew we became increasingly aware of the importance of a well-implemented plan of rehabilitation. For these old people the horizons of life have gradually narrowed. Contacts with friends and relatives have dwindled, usefulness in the world seems to have ended, and interests and hopes have neared the vanishing point. Apathy and melancholy attend upon idleness—a poor mental climate in which to nurture recovery or improvement of health.

They responded gratifyingly to efforts at rewakening their interests, providing occupation and increasing their physical capacity and skill. Entertainment and religious exercises were a part of this program. Excellent results were gained from individualized physical retraining by which the patients were taught to walk, and from exercise and occupational activities which helped to utilize their handicapped limbs and muscles. A most important adjunct was the use of the workshop where the patients found interest and incentive and gained skill in light carpentry, metal work, carving, needlework, basketry and weaving. In its cheerful and busy atmosphere many seemed, indeed, to take a new lease on life.

SUMMARY

The development of this geriatric surgical service has been a most valuable experience. We have learned much from it and have been enabled to bring better care to our patients. We have noted a definite trend toward a lowered mortality even while extending the field of surgical relief applicable to this older age group. It has afforded an excellent opportunity for investigation in several fields, particularly in that of peripheral vascular disease. It has given the means of intensive teaching.

We have been rewarded by accomplishing the return of an increasing number of our patients to comfortable life outside the hospital—some to the City's custodial institutions, some to their families and homes, some even to a resumption of light occupation. These are the desired ends which justify the organization and conduct of a surgical service especially planned for the care of the aged.

OSTEOARTHRITIS OF THE HIP

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Osteoarthritis of the hip is synonymous with malum coxae or morbus coxae senilis, hypertrophic arthritis, degenerative arthritis, wear-and-tear arthritis, and arthritis deformans. The weight-bearing joints are most often and most severely involved. Arthritis of this type is rare before the age of 30 and fairly common among patients more than 60 years of age. It is a part of the aging process, similar to graying of the hair, wrinkling of the skin, or arteriosclerosis. Just as with graying of the hair, in some persons the process manifests itself early in life, in others late.

The minimal traumas of life—the wear and tear of everyday activities—affect most the weight-bearing joints. Any articulation which is mechanically deficient will "burn out" much earlier than will one which functions perfectly. Subluxation of the hip, congenital dislocation, Legg-Calvé-Perthes disease and slipped femoral epiphysis, each leaving deformity within the joint, are among the more common causes of osteoarthritis of the hip. Direct trauma to the hip joint, pre-existent rheumatoid arthritis, pyarthrosis at an earlier period of life, and aseptic necrosis of the femoral head also may result in the development of osteoarthritis at a relatively early age.

TREATMENT

Nonsurgical

The effects of wear and tear or the aging processes cannot be reversed. Nonsurgical therapy has consisted principally of rest, and this is one of the most important ways of dealing with the problem. If a person who has symptoms of osteoarthritis, and whose roentgenograms show beginning changes indicative of the wear-and-tear processes, is willing to reorganize his life—for example, to give up golf, or avoid walking when he can ride—he may prolong the usefulness of his hip joint and delay disability for many years. Rest in bed with traction relieves the acutely painful hip, providing a degree of comfort and activity for months or years. Crutches, to relieve weight bearing; heat and massage, to improve the local circulation; and salicylates, to aid in diminishing the discomfort, have proved helpful.

ACTH and cortisone are of little value in osteoarthritis of the hip. An increase in the dietary protein intake, amino acids and protein concentrates given intravenously and orally are of greater benefit than ACTH or cortisone.

Butazolidin, although toxic and depressing to the hematopoietic tissues of some patients, is the most effective agent yet found for the relief of pain in osteoarthritis.

Surgical

Surgical procedures of various kinds have been performed, with varying degrees of success. For the osteoarthritic hip which has become truly disabling, arthrodesis has given the greatest degree of relief from pain. A stiff hip in good position is far less disabling than most physicians realize. But many patients prefer some discomfort with preserved hip motion.

Acetabuloplasty, as recommended by Smith-Petersen (1), with removal of the overhanging osteophytic bone around the acetabulum and of the thick and edematous capsule, has afforded a degree of relief to some patients. Such benefit as has accrued from acetabuloplasty, or from so-called debridement—cleaning out of the joint and trying to trim off the rough surfaces and osteophytes as recommended by Magnusson—probably was the result of denervation. The excision of the joint capsule removed much of the nerve supply of the anterior and superior portions of the joint. The patient still had his arthritis and limitation of motion, and pain recurred.

Subtrochanteric osteotomy, which makes it possible to rotate a new weight-bearing surface to the top weight-bearing position of the femoral head—a surface that has not been worn down as much as that on which the patient has been walking—also has proved helpful.

Arthroplasty. Before Smith-Petersen's vitallium cup, occasional arthroplasties of the hip were undertaken. Substances employed to prevent refusion of the hip included pig bladder, used by Baer in Baltimore, and fascia lata to cover the head of the femur, used by many surgeons throughout the United States.

Since 1936, when Smith-Petersen did his first work with the vitallium cup, arthroplasties of the hip have been more successful in relieving pain and maintaining a degree of motion than the other procedures mentioned, and as a result they have become widely used. Unfortunately, even Smith-Petersen found that some cup arthroplasties did not stand up. Bone grew around the edges of the cup, or the edge of the cup cut into the neck of the femur and produced irritative inflammation and pain. In many cases the arthroplasty had to be revised—some of them two or three times—and after one or more failures some patients requested arthrodesis.

Denervation. Some patients who were not considered good risks or who for other reasons could not be subjected to arthroplasty were treated by denervation. The obturator nerve can be completely severed intrapelvically, or the anterior branches which most often carry nerve supply to the hip joint and also innervate the adductor muscles may be avulsed at the same time that the tight adductors are released by tenotomy.

Excision of the sciatic or the femoral nerve branch to the hip joint is not easy. Sometimes the nerve branches are difficult to find. Also, experience has shown that even when all nerve branches that can be found are severed, relief of pain for more than a few weeks is obtained in only about 50 per cent of cases. Combined with arthroplasty, section of tight adductor muscles and avulsion of the anterior obturator nerve are worthwhile, when the adductor muscles are in spasm.

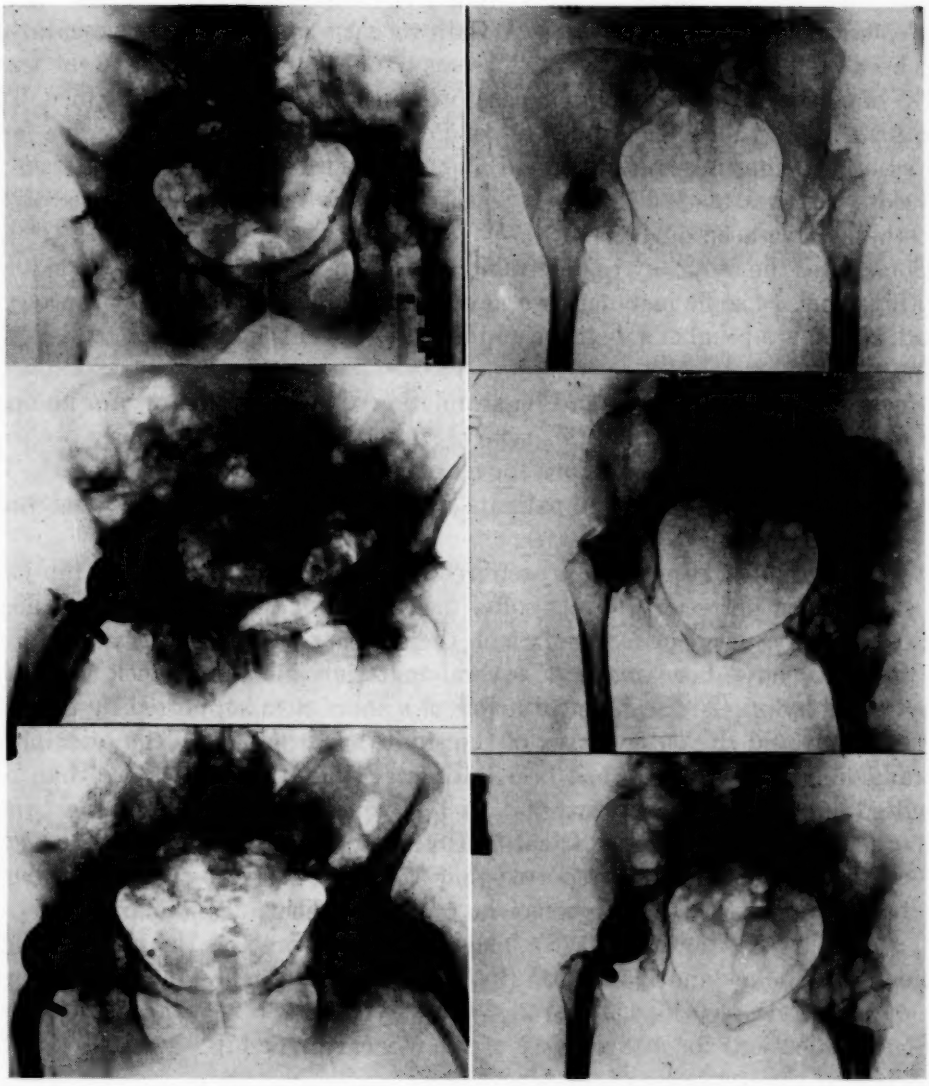

FIG. 1 FIG. 2

FIG. 1. C. M., male, aged 64 years, severely disabled because of osteoarthritis of both hips. Roentgenogram dated:

October 30, 1950 (top, left) shows the marked degenerative changes in both hips.

March 1, 1953 (center, left) after Eicher prosthesis arthroplasty of the right hip.

November 20, 1953 (bottom, left) shows the hips after a Moore prosthesis arthroplasty of the left hip. The patient was remarkably rehabilitated by these operations.

FIG. 2. M. W., female, aged 41 years, with osteoarthritis of both hips, which resulted from bilateral congenital dislocation of the hips, unsuccessfully treated. Roentgenogram dated:

July 6, 1951 (top, right) shows subluxation of the left hip and deformity of both femoral heads. Pain and restricted hip motion constituted severe disability.

August 26, 1952 (center, right) shows the fused left hip in good position after subtrochanteric osteotomy. The Smith-Petersen cup arthroplasty of the right hip was a complete failure.

November 26, 1952 (bottom, right) shows both hips after changing the cup arthroplasty to an intramedullary stem type of prosthesis. A good result was obtained.

Replacement of the femoral head. Within recent years a new armamentarium has been made available to us, which seems to offer a better answer to the treatment of osteoarthritis of the hip in cases in which major surgery is justified. Two brothers, Robert and Jean Judet (2) of Paris, were the first to present a large series of patients in whom deformed and arthritic femoral heads had been replaced with ones made of acrylic. Since that time many modifications of the prosthesis have been developed.

Sometimes the only way to determine the reason for severe pain is to reinvade the hip joint. In some instances we have found a split-off portion of the acrylic head. Nylon is a tougher substance and is more resilient, but it has a tendency to tighten in the hip joint.

Regardless of age, if heart and renal function appear satisfactory for an operation, patients will withstand this type of surgery quite well. Formerly, we were afraid to operate on older persons for fear there would be a surgical death. We have operated successfully on patients more than 90 years of age and there have been no operative deaths.

The posterolateral approach is preferred. Patients who have had the hip-joint capsule opened posteriorly rarely suffer dislocation of the prosthesis, but dislocations have occurred in cases in which the anterior approach was used.

Prostheses have been made of several materials including steel, vitallium, acrylic and nylon. To the Judet principle of a short stem supported by the neck of the femur and the outer cortex of the shaft, has been added the principle of intramedullary fixation. It has been estimated that there are more than one hundred different kinds of prostheses, each of which varies in some respect from the other. The Committee on Scientific Investigation of the American Academy of Orthopaedic Surgeons (3) reported that 37 varieties of prostheses were being used and preferred by the surgeons who replied to their questionnaire. Peterson (4), McBride (5), MacAusland (6), Thomson (7), Moore and Bohlman (8), and Donaldson, Sankey and Donaldson (9) have reported encouraging results in the use of hip prostheses (Figs. 1 and 2).

Some indications for arthroplasty of the osteoarthritic hip:

1. Bilateral osteoarthritis of the hips
   a) Choice between fusion of one hip and arthroplasty of the other; or arthroplasty of both hips;
2. Reduced or lost knee-joint function on the same side;
3. Arthritis of the lumbar spine with limited mobility.

In every case of osteoarthritis of the hip the acetabulum will be found to be damaged. The extent to which the articular surfaces can be made smooth and the contour of the acetabulum to conform to the endoprosthesis will be prime factors in determining the degree of success of the operation. Many more years may elapse before we shall be able to discuss end-results in terms of statistics. As of this date, it is my opinion that for selected cases the endoprosthesis arthroplasty is the procedure of choice.

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CUTANEOUS MALIGNANCY IN ELDERLY PEOPLE

GEORGE C. ANDREWS, M.D.* AND ANTHONY N. DOMONKOS, M.D.*

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The ever increasing tendency for cutaneous neoplasms to develop with senescence makes it imperative for the physician to take more notice of new growths on the skin of his patients who are past middle age.

The longer span of human life has brought about an increased incidence of cutaneous cancer. By the time man has reached the age of 60 or 70, his skin has aged to the point of reduced vitality. However, the exposed areas of his skin are more affected than the unexposed portions. This is due to the cumulative effects of exposure to sun, wind, rain, heat and cold, and to various chemicals to which his skin has been subjected. With today's shorter working hours and earlier retirement age, modern man has more time and opportunities to be out of doors, thereby increasing exposure to the elements.

In the routine examination of adults, especially those over 50 years of age, the physician is called upon to differentiate between benign and malignant neoplasms as well as precancerous lesions, many of which may be direct outgrowths of senescence and/or exposure.

BENIGN NEOPLASMS

The most commonly observed benign neoplasms on the skin of the elderly are pigmented nevi; seborrheic keratoses; skin tags, especially around the neck; fibromas or histiocytomas; xanthelasma on the eyelids; and senile angiomas, usually on the chest.

By far the most frequent of these lesions are the pigmented nevi or moles. The benign forms of pigmented nevi are those fleshy moles that vary in color from light to dark brown, or even black. They are hairy and have a verrucous surface. Seborrheic keratoses are seen on the face, neck, chest and back. They are pigmented, warty and greasy in appearance, and crumble if scraped with the fingernail. The face and trunk of the elderly patient may be literally covered with keratoses. Other lesions appearing frequently around the neck and supraclavicular areas in middle-aged and aged individuals are skin tags. These are easily removed, and the cosmetic results are excellent. A benign neoplasm common to elderly people is the fibroma or histiocytoma. This is a circumscribed, slightly elevated, dome-shaped, reddened, firm papule or nodule frequently seen on the lower extremities. The firm infiltration of the lesion suggests malignant potentialities to those unfamiliar with it. Xanthelasma of the eyelid very frequently causes concern to the layman regarding the possibility of cutaneous malignancy. The yellow, elevated plaques are readily recognized by the physi-

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cian. Senile angiomas are small blood-vessel tumors seen most frequently on the chest. Traumatic angiomas on the lips of elderly people are not uncommon. These are also benign.

PRECANCEROSES

Many lesions found on aged skin have a definite potentiality for developing into malignant neoplasms. The most common precursor of squamous-cell epithelioma is senile keratosis or actinic keratosis. This lesion is usually seen on the exposed parts of the skin, such as the face and dorsal surface of the hands. It is infiltrated, reddish, and slightly scaly, and may be differentiated readily from greasy and warty seborrheic keratosis.

Another precancerous lesion is leukoplakia. Many elderly people wear some kind of denture, and abrasion and irritation from dentures, coupled with irritations from hot foods and drinks, plus smoking, may account for the increased incidence of leukoplakia of the mouth in the aged. There is a tendency for the elderly to be on a poorly balanced diet, with tea and toast serving as the main items of sustenance. Improper nutrition with accompanying lack of vitamins may play a definite role in the development of leukoplakia. Syphilitic leukoplakia has the same possibilities of becoming malignant.

Other precanceroses that may be seen in the elderly are stasis ulcers of long duration on the shins and ankles. Chronic irritation around the area of a draining fistula also may produce epidermal cancer.

Arsenical keratoses, which sometimes appear many years after the ingestion of arsenic, may develop into squamous-cell epitheliomas or Bowen's disease.

MALIGNANT NEOPLASMS

By far the most commonly encountered malignant neoplasm is the basal-cell epithelioma. In a study of 1,000 cases of epitheliomas selected at random from our private practice (1), it was found that 847 (84.7 per cent) were basal-cell epitheliomas. Squamous-cell epitheliomas occurred in 125 (12.5 per cent). Other types such as basosquamous-cell epitheliomas and Bowen's disease occurred in 28 (2.8 per cent) of these patients.

Basal-cell epithelioma. The high percentage of basal-cell epithelioma found in this particular study may be due to the fact that most of our patients are city dwellers, exposed but little to actinic rays. Moreover, the incidence of squamous-cell epithelioma of the lower lip has diminished with the decrease in pipe smoking. Squamous-cell epitheliomas may be expected to be more frequent in rural populations receiving more exposure to the elements, especially to actinic rays. Basal-cell epitheliomas occur most frequently on the face, ears and neck. These lesions as a rule do not metastasize.

Squamous-cell epithelioma. Since epitheliomas on the mucous membranes are of the squamous-cell type, it is not surprising that in our series of 1,000 cases the lower lip was the most frequent site, namely, in 30 out of 125 cases (24 per cent). The fingers and the dorsal surface of the hands were the next most fre-

quently involved areas. The tip of the nose, the ears, and the lower jaws showed approximately the same frequency of involvement. Of the 125 cases of squamous-cell epithelioma, 86 (68 per cent) occurred in patients 60 or more years of age.

Basosquamous-cell epithelioma. This type of epithelioma comprised a relatively small proportion of the 1,000 cases. Usually it is difficult to diagnose clinically, since the morphologic appearance is not very characteristic. Biopsy diagnosis establishes the nature of the lesion.

Other epitheliomas. Among the less common epitheliomas of the skin in elderly people are Paget's disease of the nipple, multicentric epitheliomas of the chest and back (sometimes with a history of arsenic ingestion) and Bowen's disease. The last involves the skin as well as the mucous membranes and a history of arsenic ingestion is not unusual. In 3 instances there was a history of carcinoma of the bladder. Metastatic carcinoma of the skin, although relatively rare, generally appears in elderly people. The most common type of metastasis to the skin is probably from the breast. Large infiltrating plaques on the chest with band-like constrictions are called "cancer en cuirasse."

Melanoma. Although the incidence of melanoma is greatest in middle-aged persons, melanoma also occurs in elderly people. In the course of decades, pigmented nevi may show regressive alterations, but malignant changes may develop in nevi exposed to trauma, especially in pressure-bearing areas such as the chest, waistline, and soles of the feet, and on exposed areas of the head and neck. It is our impression that just as juvenile melanoma carries a favorable prognosis, melanoma occurring late in life bears a much more favorable prognosis than can be expected when it occurs in the middle-aged.

INCIDENCE OF EPITHELIOMAS

In a previous report (1) of the 1,000 cases of skin cancer selected at random from our private practice, it was found that 249 (25 per cent) were in patients between 50 and 59 years of age, 290 (29 per cent) in patients between 60 and 69 years of age, 157 (15.7 per cent) in patients between 70 and 79 years of age, and 58 (5.8 per cent) in patients 80 years of age and older. Actually, 505 patients (50.5 per cent) were 60 years of age or older.

The incidence for the 1,000 cases of epithelioma according to sex was 556 in males and 444 in females, with a ratio of 1.2 to 1. Among the patients 60 years of age and older, there were 318 males and 187 females. The ratio of 1.7 males to 1 female is not particularly noteworthy.

In the 505 patients 60 years of age and older, 403 (80 per cent) of the cases were basal-cell epitheliomas, 79 (15.5 per cent) were squamous-cell epitheliomas, and 23 (4.5 per cent) were mixed-cell, transitional, or Bowenoid. These percentages run a close parallel to those in the entire group of 1,000 cases. Clinical diagnosis agreed closely with the histopathologic diagnosis.

THERAPY OF CUTANEOUS MALIGNANCY

In treating cutaneous malignancy in the elderly, a thorough evaluation of the patient's physical condition is necessary, with the infirmities of old age kept in

mind. It is desirable for the patient to remain ambulatory, and therefore extensive surgical procedures that would confine him to bed are to be avoided. Small lesions favorably located on the cheeks, forehead, ears and extremities may be excised. Some of the small lesions may be treated by electrosurgery, which is especially desirable in patients who are confined at home much of the time. Except in melanoma, the best treatment for cutaneous malignancies in the aged is by means of x-rays or radium. The treatments are painless, easily administered and do not interfere with the patient's daily activities. Healing is only a little slower than after excision and primary closure. Any area of skin is readily accessible to x-ray treatment.

Of the 505 patients 60 years of age and older, 361 (71 per cent) were treated by roentgen therapy; 80 (16 per cent) were treated by excision or by excision and grafting; 6 (10 per cent) were treated by electrosurgery alone; and 58 (11 per cent) were treated by a combination of electrosurgery and radiation. Among these 505 patients over 60 years of age, there were 21 recurrences (4 per cent). Ten of the recurrences (50 per cent) were in patients treated twenty years previously, when 800–1,200 r was considered an adequate cancericidal dose of x-rays.

Melanomas and junction nevi, which may be precursors of melanomas, are best treated by wide excision. In elderly patients with melanoma and no regional lymph node involvement, wide excision without lymph node dissection is recommended.

X-RAY THERAPY TECHNIC

The evolution of x-ray therapy technic to its present-day form has brought about larger doses of x-rays without permanent injury to normal tissues, and yet dosage lethal to the cancer cells. This technic consists of giving an average total dose of 5,000 r in divided doses.

The total dose to be given is usually divided into ten, and not less than eight treatments. The fractional dose may be given daily, every other day, or even twice weekly, although daily treatment is preferable. With this method the normal cells have an interval for recovery between treatments, and the cancer cells are more apt to be radiated in the more sensitive mitotic phases.

The total dose is influenced by the size of the radiation field. Small lesions receive more roentgens because the radiation is less scattered. For the ordinary basal and squamous-cell epitheliomas, treatment is given at 100 kv. (half-value layer 1 mm. Al). Epitheliomas 1.5 cm. or less in diameter require a dose of 6,000 roentgens (8 x 750 r). The total dose is reduced for larger lesions until tumors 3 cm. or more in diameter receive 3,000 r.

The technic is varied when necessary, as in superficial epitheliomas requiring less penetrating x-rays, namely, 60 kv. (H. V. L. 0.7 mm. Al), with a total of 8,000 r in divided doses. For skin cancer of the eyelid and especially at the inner canthus, the contact type of x-ray apparatus at 45 kv. (H. V. L. 0.55 mm. Al) is preferred, with a total dose of 10,000 r. The eyeball is protected by the insertion of a brass eye-shield under the eyelid.

Thick massive epitheliomas necessitating more depth dose than that delivered

by the foregoing technic are best treated with higher kilovoltage and more filtration. This is accomplished with 140 kv. and adequate filtration to produce a half-value layer of at least 4 mm. of Cu.

Treatment failures are always due to improper technic, by not allowing sufficient field about the visible margin of the tumor, and by incorrect estimation of the tumor depth, so that the radiation reaching the base of the tumor is inadequate. These various technics produce good results with few if any recurrences. The cosmetic results are excellent and the healed area is a smooth pliable scar.

SUMMARY

Senescence carries the burden of an increased incidence of cutaneous neoplasms. The most commonly encountered benign, precancerous and malignant cutaneous neoplasms in the aged are discussed. Reasons are given for their increased frequency in the aged.

An analysis of 1,000 cases of epithelioma revealed that 505 (50.5 per cent) were in patients 60 years of age or older. More skin cancers occurred in the 60's than in any other decade of life. Of the 505 cases in patients 60 years of age or older, 403 (80 per cent) were basal-cell epitheliomas, 79 (15.5 per cent) were squamous-cell epitheliomas, and 23 (4.5 per cent) were basosquamous and other forms of epitheliomas. Males predominated in a ratio of 1.7 to 1. The greatest number (71 per cent) of cases in the elderly were treated by roentgen therapy. Sixteen per cent were treated by surgical methods and 1 per cent by electrosurgery. Roentgen therapy is the most desirable treatment for cutaneous cancer in the elderly patient.

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In keeping with the objectives of the Society to make readily available to the medical profession knowledge of the latest clinical practices having to do with this broad field

THE AMERICAN GERIATRICS SOCIETY

will give a

GRADUATE SYMPOSIUM on GERIATRIC MEDICINE

at the Roosevelt Hotel, New York City, November 12 and 13, 1954.

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Distinguished specialists from our leading medical schools and teaching hospitals will conduct the symposium.

We cordially invite all interested physicians to attend this important symposium.

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The Roosevelt Hotel in New York has set aside a number of rooms to take care of physicians attending this symposium. Those who plan to attend should write to Mr. A. G. Schellenberg, Reservation Manager, Hotel Roosevelt, Madison Avenue at 45th Street, New York 17, New York. Mention that you will attend the symposium and Mr. Schellenberg will be glad to take care of your needs.

The American Geriatrics Society

PROGRAM

GRADUATE SYMPOSIUM ON GERIATRIC MEDICINE

November 12 and 13, 1954

Friday, November 12—9:00 a.m. to 1:00 p.m.

Edward Henderson, M.D., presiding

9:00– 9:20

1. GERIATRICS—A DEFINITION
   Marvin Weinberg, M.D., New York, N. Y.

9:20– 9:40

2. LOW DOSAGE ANDROGEN-ESTROGEN THERAPY IN THE MALE AND FEMALE OLDER AGE GROUP
   Charles H. Birnberg, M.D., Attending Physician, Obstetrics, Female Sex Endocrinology, and Female Endocrine Research, Jewish Hospital, Brooklyn, New York.

9:40–10:00

3. Male Climacterium

Thomas H. McGavack, M.D., Professor of Clinical Medicine, New York Medical College, Flower and Fifth Avenue Hospitals, New York, N. Y.

10:00–10:15

Discussion

10:15–10:30

Recess for refreshments

10:30–11:00

4. Recent Progress in Cancer Therapy

Cornelius P. Rhoads, M.D., Professor of Pathology, Sloan-Kettering Division of Cornell University Medical College; Director, Sloan-Kettering Institute for Cancer Research; and Scientific Director, Memorial Center for Cancer and Allied Diseases, New York, N. Y.

11:00–11:30

5. Project and Technique Rationale of Sex Steroid Replacement in the Neuter Gender

William H. Masters, M.D., Associate Professor of Obstetrics and Gynecology, Washington University, St. Louis, Missouri.

11:30–12:00

6. Prostatic Obstruction in the Aged

Robert S. Hotchkiss, M.D., Professor and Chairman, Department of Urology, New York University-Bellevue Medical Center, New York, N. Y.

12:00– 1:00

7. Surgical Alleviation of Parkinsonism: Effects of Occlusion of the Anterior Choroidal Artery

Irving S. Cooper, M.D., Associate Professor of Neurosurgery, New York University-Bellevue Medical Center, New York, N. Y.

Friday, November 12—2:00 p.m. to 5:45 p.m.

Thomas H. McGavack, M.D., presiding

2:00– 2:30

8. The Endocrine Glands and Their Ability to Stabilize Body Function Under Stress Conditions

William B. Kountz, M.D., Assistant Professor of Clinical Medicine, Washington University School of Medicine, St. Louis, Missouri.

2:30– 3:00

9. Emergency and Prophylactic Corticoid Therapy in Individuals Past Fifty

Laurance W. Kinsell, M.D., Director, Institute for Metabolic Research, Highland Alameda County Hospital, Oakland, California.

3:00– 3:30

10. Nutrition and Aging

Fredrick J. Stare, M.D., Professor of Nutrition, and Chairman, Department of Nutrition, Harvard University, School of Public Health, Boston, Massachusetts.

3:30– 3:45

Recess for refreshments

3:45– 4:15

11. Recent Advances in the Treatment of Senile Vaginitis, Kraurosis, and Leukoplakia

Charles Lee Buxton, M.D., Professor of Obstetrics and Gynecology, and Chairman, Department of Obstetrics and Gynecology, Yale University School of Medicine, New Haven, Connecticut.

4:15– 4:45

12. Obesity and Diabetes: Two Related Problems of Later Life

C. N. H. Long, M.D., Professor of Physiology, and Chairman, Department of Physiology, Yale University School of Medicine, New Haven, Connecticut.

4:45– 5:15

13. The Preparation of the Geriatric Patient for Surgery of the Biliary Tract

Frank Glenn, M.D. and Richard Karl, M.D.***

* Professor of Surgery, ** Instructor in Surgery, Cornell University Medical College; * Surgeon-in-Chief, ** Assistant Attending Surgeon, New York Hospital, New York, N. Y.

5:15– 5:45

14. Respiratory Allergy and Its Modifications in Patients Over Forty-Five Years of Age

Fred W. Wittich, M.D., Managing Editor, *Annals of Allergy*, and Secretary-Treasurer, The American College of Allergists, Minneapolis, Minnesota.

Saturday, November 13—9:00 a.m. to 12:45 p.m.

Laurance W. Kinsell, M.D., presiding

9:00– 9:30

15. Ovarian Function in Menopausal and Postmenopausal Women

C. Alvin Paulsen, M.D., William O. Maddock, M.D.† and Robert B. Leach, M.D.‡*

* U. S. Public Health Service Fellow in Medicine, † Assistant Professor of Medicine, ‡ Instructor in Medicine, Wayne University College of Medicine, Detroit, Michigan.

9:30–10:00

16. Gynecologic Cancer in the Older Patient

John McLean Morris, M.D., Associate Professor of Gynecology, Yale University School of Medicine, New Haven, Connecticut.

10:00–10:30

17. Clinical Studies in Prostatic Cancer

William Wallace Scott, M.D., Professor of Urology, Johns Hopkins University School of Medicine, Baltimore, Maryland.

10:30–10:45

Recess for refreshments

10:45–11:15

18. Cortisone in the Treatment of Advanced Cancer
Carlos P. Lamar, M.D., Director, Department of Endocrinology, Jackson Memorial Hospital of the Medical School, University of Miami, Miami, Florida.

11:15–11:45

19. The Influence of Emotional Attitudes on the Aging Process
David C. Wilson, M.D., Professor of Neurology and Psychiatry, and Chairman, Department of Neurology and Psychiatry, University of Virginia School of Medicine, Charlottesville, Virginia.

11:45–12:15

20. Problems of Chemotherapy in the Older Age Group
David Lehr, M.D., Professor of Pharmacology and Associate Professor of Medicine, New York Medical College, Flower and Fifth Avenue Hospitals, New York, N. Y.

12:15–12:45

21. Elevated Titers of Steroids in Obese Men and the Possibility that Steroids Promote Some of the Adverse Effects Associated with Obesity
James B. Hamilton, M.D., Professor of Anatomy, State University of New York, College of Medicine, Brooklyn, New York.

Saturday, November 13—2:00 p.m. to 6:00 p.m.

Malford W. Thewlis, M.D., presiding

2:00– 2:30

22. The Advantages of the Use of Unrestricted Diet in the Treatment of Peptic Ulcer in the Aged
Edward A. Marshall, M.D., Chief, Department of Medicine, Huron Road Hospital, East Cleveland, Ohio.

2:30– 3:00

23. The Pros and Cons of Estrogen Administration after the Menopause
E. Kost Shelton, M.D., Clinical Professor of Medicine, University of California at Los Angeles, Los Angeles, California.

3:00– 3:30

24. Cortisone in the Immediate Therapy of Apoplectic Stroke
Henry I. Russek, M.D., Consultant in Cardiovascular Research, U.S.P.H.S., Associate Cardiologist, Seaview Hospital, and Attending Cardiologist, Staten Island Hospital, OPD, Staten Island, New York.

3:30– 3:45

Recess for resfreshments.

3:45– 4:05

25. The Relationship of Blood Lipids to Coronary Heart Disease
Menard M. Gertler, M.D., Special Research Fellow, National Heart Institute, Department of Biochemistry, New York University-Bellevue Medical Center, New York, N. Y.

4:05– 4:25

26. The Effects of Sitosterol and Lipotropes on the Blood Lipids and the Clinical Course of Angina Pectoris

Charles F. Wilkinson, Jr., M.D., Professor of Medicine, and Chairman, Department of Medicine, New York University Medical School, New York, N. Y.

4:25– 4:45

27. Recent Developments in the Treatment of Hypertension

Edward D. Freis, M.D., Chief of Medicine, Veterans Administration Hospital; Chief, Cardiovascular Research Laboratory, Georgetown University Hospital; and Adjunct Clinical Professor of Medicine, Georgetown University School of Medicine, Washington, D. C.

4:45– 5:05

28. Heart Disease and Obesity

Arthur M. Master, M.D. and Harry L. Jaffe, M.D.***

* Associate Clinical Professor of Medicine, ** Lecturer, Columbia University, College of Physicians and Surgeons; * Cardiologist, ** Attending Physician, Mount Sinai Hospital, New York, N. Y.

Edward Henderson, M.D., presiding

5:05– 6:00

Panel Discussion on Heart Disease

Doctors Freis, Gertler, Lehr, Master, Russek, and Wilkinson.

1955 ANNUAL MEETING

AMERICAN GERIATRICS SOCIETY

Hotel Roosevelt, New York City
April 21 and 22, 1955

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The Annual Meeting of the American Society for the Study of Arteriosclerosis will be held *October 31 and November 1, 1954*, in the Sheraton Hotel, Chicago, Illinois. Dr. A. C. Corcoran, Cleveland Clinic, Cleveland 6, Ohio, is Program Chairman. The complete program and abstracts will be published in the October issue of *Circulation*.

O. J. Pollak, M.D.,
Secretary-Treasurer,
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